

**CLASS 530, CHEMISTRY: NATURAL RESINS OR DERIVATIVES; PEPTIDES OR PROTEINS; LIGNINS OR REACTION PRODUCTS THEREOF**

**SUBCLASSES**

**200** Natural resin derivatives which are not pure compounds, and processes of treating natural resins or derivatives.

- (1) Note. Natural resins are water-insoluble mixtures of compounds derived from trees, especially conifers. Many of the compounds present in natural resins have a hydroaromatic structure. These compounds are often recovered as mixtures of isomeric carboxylic acids, such as abietic and pimaric acids, which occur in rosin. The resins occur in nature in solvent-free form, such as fossil coal or copal resins, wood rosin in old pine tree stumps, etc., or in the form of tree sap, such as pine oleoresin, where they are dissolved in terpenic hydrocarbons, such as spirits of turpentine. Another major source of natural resin is papermaking waste from which a solution of rosin in mixed fatty acids, known as tall oil, is recovered.
- (2) Note. See search this class, subclass note below for a description of the constituents of and types of rosin.
- (3) Note. Tall oil, which is a liquid, is provided for here, along with its constituents and derivatives, because of significant resin acid content (34% - 40%). See search this class, subclass note below for description of tall oil and (3) Note for tall oil fatty acids.
- (4) Note. Some of the natural resins encompassed by this and indented subclasses include, but are not limited to: wood, gum and tall oil rosin; wood or pine tar or pitch; shellac; copals from various sources, both recent and fossil, such as Congo, Manila, etc.; amber; dammar; kauri; coal resin; gum accroides; sandarac; cativo resin; etc.

(5) Note. This and indented subclasses (200+) provide for the production of mixtures of compounds from natural resins, whether or not the individual compounds have a known chemical structure.

(6) Note. The production of a pure resin acid or its derivative of known chemical structure from natural resins is classified in the class and subclass providing for the compound produced.

(7) Note. Compositions comprising natural resin or its derivative, together with another component, and having a known utility, are classified in the appropriate composition class.

(8) Note. The rules for determining Class placement of the Original Reference (OR) for claimed chemical compositions are set forth in the Class Definition of Class 252 in the section **LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**, subsection **COMPOSITION CLASS SUPERIORITY**, which includes a hierarchical **ORDER OF SUPERIORITY FOR COMPOSITION CLASSES**.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 205, (1) Note, for description of tall oil and (3) Note for tall oil fatty acids.
- 210, (1) Note, for a description of the constituents of and types of rosin.

**SEE OR SEARCH CLASS:**

- 106, Compositions: Coating or Plastic, for compositions wherein a natural resin or tall oil is utilized.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials, including inorganic or organic.
- 162, Paper Making and Fiber Liberation, for processes of liberating cellulosic fibers which include the recovery of an organic by-product.

- 520, Synthetic Resins or Natural Rubbers, including the classes which are part of the 520 series, for synthetic resin compositions wherein a natural resin or tall oil is utilized.
- 536, Organic Compounds, for gums which are water-soluble highly branched polysaccharides found in exudations of plants.
- 201** This subclass is indented under subclass 200. Processes wherein the starting material is shellac, or a shellac-containing substance, or products of such processes.
- (1) Note. Included herein are starting materials wherein the shellac has been previously modified, e.g., by bleaching, formation of a derivative, etc.
- 202** This subclass is indented under subclass 200. Processes wherein the starting material is cut wood, or products of such processes.
- (1) Note. A major product of the processes under this subclass is wood rosin.
- (2) Note. See the search note below for description of the constituents of and types of rosin.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 210, (1) Note, for a description of the constituents of and types of rosin.
- 203** This subclass is indented under subclass 200. Processes wherein the starting material is plant sap or a fossilized substance, or products of such processes.
- (1) Note. The starting materials include, but are not limited to: copals from various sources, e.g., Congo, Manila, Pontianac, etc.; coal which contains admixtures of resin, such as Utah; amber; dammar; kauri; gum accroides; etc.
- 204** This subclass is indented under subclass 203. Processing wherein the starting material is pine oleoresin, or products of such processes.
- (1) Note. Pine oleoresin is the fresh sap of living pine trees and is variously referred to in the trade as gum turpentine, pine gum, pine resin, etc.
- (2) Note. A major product of the processes under this subclass is gum rosin.
- (3) Note. See (1) Note under subclass 210 for description of the constituents of and types of rosin.
- 205** This subclass is indented under subclass 200. Processes wherein: (1) tall oil or a derivative thereof is recovered from papermaking waste; (2) one or more components are separated from tall oil; (3) tall oil is purified; or products of such processes.
- (1) Note. Tall oil is a by-product of the wood pulp industry and is usually recovered from pine wood "black liquor" of the sulfate or kraft paper processes. A typical composition of tall oil includes 50-60% fatty acids (e.g., oleic, linoleic, etc.), 34-40% rosin acids, and 5-10% unsaponifiable matter, such as long chain alcohols and sterols.
- (2) Note. Some of the products isolated from tall oil include, but are not limited to, tall oil rosin, tall oil fatty acids, tall oil pitch, mixtures of oleic and linoleic acid, etc.
- (3) Note. Although "tall oil fatty acids" contain at least 90% of free fatty acids, they are included among natural resins because of a measurable content of rosin acids (up to 10%).
- (4) Note. Compositions containing tall oil or its reaction product as an ingredient thereof and having a known utility are classified in the appropriate composition class providing therefor.
- 206** This subclass is indented under subclass 205. Processes wherein there is utilized an organic material containing sulfur or nitrogen, or products of such processes.
- 207** This subclass is indented under subclass 205. Processes which include an esterification step, or products of such processes.

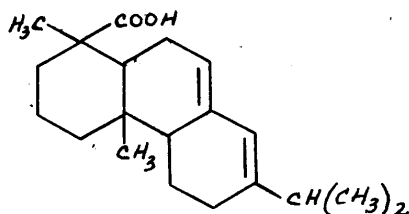
**208** This subclass is indented under subclass 205. Processes wherein there is utilized an inorganic material, or products of such processes.

**209** This subclass is indented under subclass 208. Processes wherein there is utilized a material containing phosphorus, heavy metal, elemental hydrogen, sulfur dioxide, or carbon dioxide; or products of such processes.

**210** This subclass is indented under subclass 200. Processes wherein rosin or a derivative thereof is used as starting material, or products of such processes.

(1) Note. Rosin, also known as colophony, is usually designated according to its source, e.g., gum rosin (from exudate of incisions on living trees); wood rosin (from Southern pine stumps); and tall oil rosin (from by-products of the wood pulp industry). The principal constituents isolated from rosin are carboxylic acids with a hydrophenanthrene nucleus, comprising abietic acid and its isomers, such as pimaric acid. The acids may exist in rosin as acid anhydrides. The mixed acids are known in the trade as rosin acids or resin acids, the two terms being used interchangeably.

(2) Note. Abietic acid has the following structure:



(3) Note. This and indented subclasses (210+) provide for the production of mixtures of compounds from rosin or its derivatives, whether or not the individual compounds have a known chemical structure.

(4) Note. The production of a pure resin (rosin) acid or its derivative of known chemical structure from rosin or its derivative is classified in a class and subclass providing for the compound produced.

#### SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, for compositions wherein a resin is utilized.

520, Synthetic Resins or Natural Rubbers, including the classes which are part of the 520 series, for synthetic resin compositions wherein a natural resin is utilized.

**211** This subclass is indented under subclass 210. Processes wherein rosin or a derivative thereof is polymerized, or products of such processes.

(1) Note. This subclass, and the indented subclass 212, are limited to polymers of rosin, per se, of a single derivative of rosin, e.g., an ester, hydrogenated rosin, etc., or of a mixture of two or more types of rosin, derivatives, etc. The most common product is dimer rosin.

#### SEE OR SEARCH CLASS:

525, Synthetic Resins or Natural Rubbers, subclasses 54.4+, for reaction products of natural resins with a preformed solid polymer or specified intermediate condensation product (SICP).

526, Synthetic Resins or Natural Rubbers, subclass 238.3, for polymers derived solely from ethylenic reactants at least one of which is a natural resin.

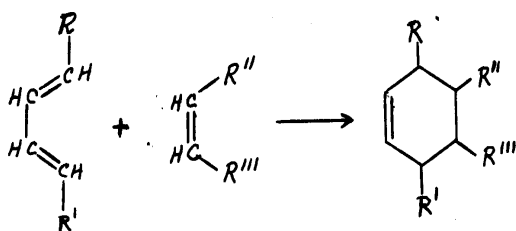
527, Synthetic Resins or Natural Rubbers, subclasses 600+, for solid polymers derived from natural resin or derivative by means of chemical reaction with a nonresin reactant.

**212** This subclass is indented under subclass 211. Processes wherein polymerized rosin or a derivative thereof undergoes further chemical treatment or color modification, or products of such processes.

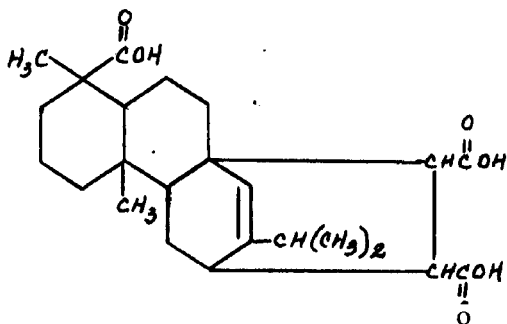
**213** This subclass is indented under subclass 210. Processes wherein there is utilized a material containing boron or phosphorus, or products of such processes.

**214** This subclass is indented under subclass 210. Products which include a six-membered ring formed by the addition of an alkene or alkyne to the 1,4 - positions of a conjugated diene.

(1) Note. An example of such a reaction may be represented as follows:



(2) Note. All adducts included in this class are mixtures formed from the mixed hydrophenanthrene acids or derivatives thereof present in rosin. An example of an adduct of an individual rosin acid with fumaric acid is:



**215** This subclass is indented under subclass 210. Processes wherein the carboxyl group of rosin or of a derivative thereof is esterified, or products of such processes.

(1) Note. Search this class, appropriate subclasses, for the esterification of rosin via an alcoholic hydroxy group which has

been introduced into rosin by a chemical reaction, e.g., with formaldehyde.

**216** This subclass is indented under subclass 215. Processes wherein esterified rosin or a derivative thereof undergoes further chemical treatment or color modification, or products of such processes.

**217** This subclass is indented under subclass 215. Processes wherein the esterification utilizes an oxygen ring containing compound or a halogen containing material, or products of such processes.

**218** This subclass is indented under subclass 215. Processes wherein the esterification utilizes a polyhydroxy containing material, or products of such processes.

**219** This subclass is indented under subclass 210. Processes wherein there is utilized a material containing sulfur, selenium or tellurium, or products of such processes.

(1) Note. Many patents in this subclass are directed to the disproportionation reaction involving an intra and inter-molecular rearrangement of the hydrogen atoms in the rosin acids to convert them into acids which lack nonbenzenoid double bond conjugation and are therefore more stable to oxidation than abietic acid. Dehydroabietic acid, one of the principal products of disproportionation, contains one aromatic ring in the hydrophenanthrene nucleus.

**220** This subclass is indented under subclass 219. Processes wherein the material containing sulfur, selenium or tellurium is inorganic.

**221** This subclass is indented under subclass 210. Processes wherein there is utilized a nitrogen containing material, or products of such processes.

**222** This subclass is indented under subclass 221. Processes wherein the material containing nitrogen is inorganic.

- 223** This subclass is indented under subclass 210. Processes wherein rosin or a derivative thereof is reacted with hydrogen, or products of such processes.
- 224** This subclass is indented under subclass 210. Processes wherein salts of rosin acids are formed using a metal containing material, or products of such processes.
- (1) Note. Metal salts of mixed naturally occurring resin (rosin) acids, also referred to as rosin soaps or metal resinsates, are included in this and the indented subclass 225.
- (2) Note. The production of a pure rosin acid derivative of known chemical structure from rosin or its derivative is classified in the class and subclass providing for the compound produced.
- (3) Note. Compositions comprising a metal resinate and another component, such as water, excess alkali, etc., and having a known utility are classified in the appropriate composition class.
- SEE OR SEARCH CLASS:  
106, Compositions: Coating or Plastic, subclasses 218+, for sizing compositions containing metal resinsates.
- 225** This subclass is indented under subclass 224. Processes wherein the metal is an alkali metal.
- SEE OR SEARCH CLASS:  
252, Compositions, subclass 367.1 for soap compositions containing alkali-metal salts of rosin acids.  
510, Cleaning Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, appropriate subclasses, particularly subclass 129, 141+, 343, 353+, 389, 437, 454, and 481+, for cleaning compositions which may comprise alkali-metal salts of rosin acids.
- 226** This subclass is indented under subclass 210. Processes wherein rosin or a derivative thereof is subjected to heat treatment in the absence of any additional nonrosin organic reactant, or products of such processes.
- (1) Note. This subclass provides, among other things, for certain disproportionation reactions. See the search note below for a description of the disproportionation reaction.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
219, (2) Note for a description of the disproportionation reaction.
- 227** This subclass is indented under subclass 226. Processes wherein a metal, halogen or silicon containing material is utilized, or products of such processes.
- 228** This subclass is indented under subclass 210. Processes for purification of rosin or its derivatives, or products of such processes.
- 229** This subclass is indented under subclass 228. Processes which utilize immiscible solvents, or products of such processes.
- 230** This subclass is indented under subclass 200. Processes wherein the starting material used is tall oil or a derivative thereof, or products of such processes.
- (1) Note. Tall oil is a by-product of the wood pulp industry and is usually recovered from pine wood "black liquor" of the sulfate or kraft paper processes. A typical composition of tall oil includes 50-60% fatty acids (e.g., oleic, linoleic, etc.), 34-40% rosin acids, and 5-10% unsaponifiable matter, such as long chain alcohols and sterols.
- (2) Note. Although "tall oil fatty acids" contain at least 90% of free fatty acids, they are included among natural resins because of a measurable content of rosin acids (up to 10%).
- (3) Note. Compositions containing tall oil or its reaction product as an ingredient thereof and having a known utility are classified in the appropriate composition class providing therefor.

- 231** This subclass is indented under subclass 230. Processes which utilize a nitrogen containing material, or products of such processes.
- 232** This subclass is indented under subclass 230. Processes wherein the acids present in tall oil are esterified, or products of such processes.
- 233** This subclass is indented under subclass 230. Processes wherein a material containing sulfur, boron phosphorus, or iodine is utilized, or products of such processes.
- 300 PEPTIDES OF 3 TO 100 AMINO ACID RESIDUES:**  
This subclass is indented under the class definition. Compounds consisting of three or more amino acids joined covalently by peptide bonds.
- (1) Note. A peptide bond is an amino bond between the carboxyl group of one amino acid and the amino group of another.
  - (2) Note. The border line, for purposes of subclasses 300 to 427, between peptides and proteins has been drawn at 100 amino acid residues or a molecular weight of about 10,000 where the number of residues is unknown.
  - (3) Note. Related peptides. A peptide is classifiable in a given subclass if its structure corresponds to at least half the amino acid residues of the named peptide. The product of side chain substitution, C or N terminal chain will be classified with the named peptide as related peptides. The product of a replacement reaction will be classified as a related peptide so long as less than half the amino acid residues of the named peptide have been replaced. The product of a removal reaction or a partial sequence (i.e., fragments) will be classified as a related peptide if half the amino acid residues of the named peptide are present. Polypeptides which are formed by joining the named peptide of identical sequence to the named peptide should be originally classified on the basis of the named peptide and cross-referenced to the appropriate subclasses.
  - (4) Note. Functional Analogues. Peptides claimed or disclosed as a functional analogue should be classified on the basis of structure, i.e., is the structure of the analogue a related peptide, and cross-referenced to the subclass providing for the named peptide that the patented peptide is claimed or disclosed as functioning like. If there is no structural information present in the patent or otherwise obtainable on the structural analogue, the patent should be originally classified in the generic peptide subclass and cross-referenced to the subclass providing for the named peptides.
  - (5) Note. Joined peptide subunits. In the case where peptide chains are joined by covalent bonding as by S-S bonds through cysteine the number of amino acids in the peptide is the sum of the individual chains.
  - (6) Note. IUPAC-IUB Nonmenclature. Published in Archives of Biochemistry and Biophysics. Titles: (1) Abbreviations and Symbols for chemical Names of Special Interest in Biological Chemistry; Revised Tentative Rules (1965); Section 5, Nucleic Acids and Nucleotides, year (1966), Volume 115, pages 1-12. (2) Abbreviated Designation of Amino Acid Derivatives and Peptides, year (1967), Volume 123, pages 1-5. (3) Rules for Naming Synthetic Modifications of Natural Peptides, year (1966), Volume 121, pages 6-8. (4) Abbreviated Nonmenclature of Synthetic Polypeptides (polymerized Amino Acid), year (1968), Volume 123, pages 633-637. (5) A One-Letter Notation for Amino Acids, year (1968), Volume 125, pages 1-5. (6) Abbreviations and Symbols for the Description of the Conformation of Polypeptides Chains; Tentative Rules (1969), year (1971), Volume 145, pages 405-421.
  - (7) Note. CAS REGISTRY NUMBERS  
Chemical Abstract Service (CAS) Registry Numbers are unique identifiers

assigned to chemical substances recorded in the CAS Chemical Registry System. The CAS Registry Number itself has no chemical significance; it is simply a machine-checkable number assigned to each substance as it enters the Registry System. CAS Registry Numbers appear in CA issues and in many computer-readable files. They also may be found in several primary journals, various handbooks, and in the National Library handbooks, and in the National Library of Medicine's TOXLINE and CHEMLINE computer-based information-retrieval services. For more about the CAS Chemical Registry System or Registry System or Registry Numbers consult the introduction to the CAS REGISTRY HANDBOOK-Number Section.

Medical Subject Headings: (1) Mesh Tree Numbers: Mesh numbers are identifiers applied to the National Library of Medicine's indexers to articles in the medical and related literature. The subject headings are Index Medicus headings and are arranged in a hierarchical matter. The abstracts and indexing are available on line through several database suppliers. (2) Deleted Registry Numbers: The CA registry numbers found in the definitions of subclass 300 to 427 are the current registry numbers. However, due to the long history and incomplete structural knowledge of peptide and protein chemistry, there are usually several deleted registry numbers for each current registry number. The current registry number should be used to find the deleted numbers in the registry file and should always be included in the online search statement. For further information on search technique related to deleted registry numbers see, CAS ONLINE NEWS May/June 1984, page 5.

- (8) Note. Structure. The primary structure of the shorter peptide has been included in the definitions. For the larger peptides the Merck Monograph will often provide citations to articles disclosing the structure. The structure of the larger peptides

and proteins may be found on the on-line services by using the compound name, Chemical Abstracts Registry Number, or National Library of Medicine's MESH tree number in combination with the terms "sequence" or "structure".

- (9) Note. Compositions. In general a peptide or protein containing composition will be provided for in a class providing for the function or utility of the composition, e.g., medicine, food, Class 252, utilities, etc. A peptide mixed with a preserving agent whose sole function is to prevent chemical or physical change is provided for with the peptide or protein. A peptide derived from a single source material such as a plant or animal extract, so long as it is identified as a protein or peptide, is classified in this class (530) even if a Class 424 utility is disclosed or claimed. A plant or animal extract will be provided in Class 424 if it is (a) a single source material and (b) is of undetermined chemical constitution, i.e., is claimed in terms of isolation technique or physical properties. A recitation as broad as "peptide" is enough to defeat placement in Class 424 on the basis of utility. Class 424 will provide for an additive mixture containing a peptide and other ingredients if the mixture has a Class 424 utility.
- (10) Note. Classification of the more common amino acids:

<u>Amino Acids</u>	<u>Classification</u>
Amino Acids commonly found in peptides and proteins:	
Alanine	562/575
Arginine	562/560
Asparagine	562/561
Aspartic acid	562/571
Cysteine	562/557
Glutamine	562/563
Glutamic acid	562/573
Glycine	562/575
Histidine	548/344
Isoleucine	562/575
Leucine	562/575
Lysine	562/562
Methionine	562/559
Phenylalanine	562/445
Proline	548/535
Serine	562/567
Threonine	562/570
Tryptophan	548/496
Tyrosine	562/444
<u>Rare amino acids from protein</u>	
Desmosine	546/335
5 Hydroxylsine	562/564
5 Hydroxyproline	548/532
Isodesmosine	546/335
3-Methylthistidine	548/335
E-N-Methyllysine	562/561
<u>Nonprotein Amino Acids</u>	
B-Alanine	562/567
V-Aminobutyric Acid	562/553
Canavanine	562/560
Citrulline	562/560
B-Cyanvalanine	260/465
Djenkolic acid	562/557
Homocysteine	562/556
Homoserine	562/567
Ornithine	562/561
Valine	526/575

- (11) Note. Synthetic Resins vs. Polypeptides. The conceptual difference between the subject matter of synthetic resins provided for in the 520 series and polypeptides (including proteins) provided for in Class 530 is that the compounds of the 520 series have statistically distributed amino acids or blocks of amino acids in their molecules in a random sequence whereas 530 provides for molecules composed of a spe-

cific sequence of amino acids defined identity and order (i.e., primary structure) having identity or closed relation to a humoral or cellular polypeptide or having some humoral or cellular effect due to its ordered structure.

- (12) Note. Peptide and Protein Structure. The nature, i.e., identity, of the constituent amino acids and their sequence is referred to as the primary structure. A primary structure will have a definite three dimensional structure which is called the secondary structure (usually helical coiling). The secondary structure of a large peptide or protein is wrapped about and interwoven to develop the overall three dimensional structure of the molecule. This arrangement of the secondary structure is referred to as the tertiary structure and determines the allosteric properties of many proteins.

#### SEE OR SEARCH CLASS:

- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials, including inorganic or organic.
- 424, Drug, Bio-Affecting and Body Treating Compositions, has the following subclasses for proteins or proteinaceous material 1.11+, for radionuclide or intended radionuclide containing; 418, 456, 460, 477+, 491+, 499, 520+; for a protein or peptide containing composition which functions as an antiperspirant or deodorant; 85.1+ for a composition containing a lymphokine; 130.1+ for a composition containing an immunoglobulin, an antiserum, an antibody, or an antibody fragment; 184.1+ for a composition containing an antigen, an epitope, or another immunospecific immunoeffector that may be proteinaceous; 278.1+ for a composition containing a nonspecific immunoeffector that may be proteinaceous; 94.1+, for compositions containing proteins identified as enzymes; 520+, for compositions many of which are considered to be proteinaceous; an animal extract of



- undetermined constitution; 115+ for compositions which may be proteins or peptides identified by elemental analysis.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 59.6, 537, 539, 629, 640, 642, and 643 for compositions containing proteins used in forming an image.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 68.1+ for microbial or enzymatic synthesis of proteins and peptides; subclasses 183+ for the production of enzymes; and subclasses 74+ for the formation of immobilized enzymes and subclasses 269 and 272+ for the liberation or purification of proteins by means of a microorganism or enzyme, particularly subclass 273 for the purification of collagen or gelatin.
- 436, Chemistry: Analytical and Immunological Testing, subclass 15 for a protein containing composition used as a standard or control; 16, for a blood standard; 66, for tests for hemoglobin or myoglobin, 66 for test for blood clotting factor tests, 86+ for tests for proteins or peptides including sequencing methods and subclass 501 for a complement binding assay and protein binding assays and subclasses 506-548 for tests using antigen antibody interactions in a chemical test, particularly subclasses 543-548 which collect methods of modifying antigens and antibodies as part of a testing procedure.
- 514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 1 through 21 and cross-reference art collections 800-809 which provide for compositions having a 424 utility containing a peptide or protein as an organic active ingredient.
- 524, Synthetic Resins or Natural Rubbers, subclasses 9+ for plant or derived cellular material, subclasses 17+ for proteins or biologically active polypeptides for a process in which the protein or polypeptide is physically mixed with a preformed resin and subclasses 70+ for a process of adding a protein or biologically active polypeptide to resin forming ingredients during reaction of the resin formers and the protein or polypeptide is nonreactive.
- 525, Synthetic Resins or Natural Rubbers, subclass 54.1 for the chemical reaction of a peptide or protein with a preformed resin and subclass 54.11 for processes of stepwise assembly of a polypeptide on a preformed polymer, i.e., solid phase synthesis when there is no claimed cleavage of the synthesized polypeptide.
- 526, Synthetic Resins or Natural Rubbers, subclass 238.1 for the formation of a synthetic resin from a protein or biologically active polypeptide where the protein or polypeptide as well as all other reactants are ethylenically unsaturated.
- 528, Synthetic Resins or Natural Rubbers, particularly subclass 328 for a polymer of amino acids and methods of making such a polyamino acid.
- 930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequences of four or more amino acids.
- 301 Thymopoietins or lipotropins; related peptides:**  
This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure of Thymopoietin.

I.     —GLY—GLN—PHE—LEU—GLU  
 ASP—PRO—SER—VAL—LEU—  
 THR—LYS—GLU—LYS—LEU—  
 LYS—SER—GLU—LEU—VAL—  
 ALA—ASN—ASN—VAL—THR—  
 LEU—PRO—ALA—GLY—GLU—  
 GLN—ARG—LYS—ASP—VAL—  
 TYR—VAL—GLN—LEU—TYR—  
 ARG

II.    —SER—GLN—PHE—LEU—GLU  
 ASP—PRO—SER—VAL—LEU—  
 THR—LYS—GLU—LYS—LEU—  
 LYS—SER—GLU—LEU—VAL—  
 ALA—ASN—ASN—VAL—THR—  
 LEU—PRO—ALA—GLY—GLU—  
 GLN—ARG—LYS—ASP—VAL—  
 TYR—VAL—GLN—LEU—TYR—  
 LEU—GLN—THR—LEU—THR—  
 ALA—VAL—LYS—ARG—  
 Or has half structure of lipotropin.

(1) Note. Thymopoietins; Physical Properties:

I   II

Number of Residues:   49   49

(2) Note. Lipotropins; Physical Properties.

Beta   Gamma

Number of Residues:   91   58

Molecular Weight: 9894

(3) Note. Thymopoietins; Physiological properties. Thymopoietin II induces T lymphocyte differentiation.

(4) Note. Lipotropins; Physiological properties. Stimulates release of fatty acids from adipose tissue. Belongs to the ATCH family of peptide hormones.

(5) Note. Thymopoietins; Synonyms. Thymin

(6) Note. Lipotropins; Synonyms: Adiposin, Lipidmobilizing hormone, Lipolytic hormone, Pituitary lipotropic hormone, Adipozin, Pituitary lipotropin LPH, adikopinetic hormone.

(7) Note. CA Registry Numbers of unmodified forms:

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 180 for thymus derived hormone or factor peptide or protein sequences.

### 302    **Endorphins and enkephalins; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

**Methionine enkephalin**

**H—Tyr—Gly—Gly—Phe—Met—OH**

**Leucine enkephalin or of Endorphin:**

**H—Try—Gly—Gly—Phe—Leu—OH**

**Tyr—Gly—Gly—Phe—Met—Thr—Ser—Gin—  
 Thr—Pro—Leu—Val—Thr—Leu—Phe—Lys—  
 Asn—Ala—Ile—Ile—Lys—Asn—Ala—Tyr—  
 Lys—Lys—Gly—Glu—.**

**Human Beta—Endorphin**

(1) Note. Physical Properties: Number of Residues

**ENDORPHIN**

**31**

**MW 3,465**

**ENKEPHALIN**

**5**

**MW 575**

(2) Note. Physiological Properties: Endorphins, Morphine like action. Found in brain, cerebrospinal fluid, pituitary and other organs. Function as neuromodulators or transmitters. Enkephalins. Pentapeptides which mimic the action of

morphine. Synthesized in the brain and pituitary possibly by degradation of endorphins.

- (3) Note. Synonyms. (a) Endorphins: Endogenous opiates, opioid peptides. (b) Enkephalins: Morphine line factor, pituitary opiate peptide.
- (4) Note. CA Registry Numbers of unmodified form:

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 80 for endorphin or enkephaline peptide or protein sequences.

**303 Insulin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure of insulin.

- (1) Note. Physiological properties. Regulates carbohydrate metabolism, influences protein and RNA synthesis and the storage of neutral lipids.
- (2) Note. Synonyms. Iletin, Endopancrine, Insular, Insulyl, Iszilin, Decurion, Actrapid.
- (3) Note. CA Registry Numbers of unmodified form: 9004-10-8

**Mesh tree number:**

D6.472.610.575

D9.482.500

**Merck Index Monograph:**

9: 4859

10:4866

**304 Metal complexes, e.g., zn-insulin, etc:**

This subclass is indented under subclass 303. Peptides in which the peptide is a complex of insulin and a metal.

- (1) Note. Typically the complex is formed by the addition of zinc chloride or a mixture of zinc chloride and protamine sulfate to insulin.
- (2) Note. Examples: Neutral Protamine Hagedorn Insulin, Lente Insulin, Insulin Novo Lente, Depo-Insulin, Deposulin; Insulyl-Retard.
- (3) Note. CA Registry Numbers of unmodified form: 9004-10-8

**Mesh Index Monograph:**

Protamine Zinc Insulin

D6.472.610.575.574

D9.482.500.642

**Merk Index Monograph:**

9:4862

10:4869

10:7786

**305 Isolation or purification:**

This subclass is indented under subclass 303. Subject matter, in which preexisting insulin is isolated or separated.

- (1) Note. Typically the processes of this subclass include solvent extraction of pancreatic tissue.
- (2) Note. See subclass 344 for a guide to generic separation techniques.

**306 Corticotropins (ATCH); related peptides:**

This subclass is indented under subclass 303. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

H-Ser-Tyr-Ser-Met-Glu-His-Phe-Arg-Trp-Gly-Lys-Pro-Val-  
 1 2 3 4 5 6 7 8 9 10 11 12 13  
 -Gly-Lys-Lys-Arg-Arg-Pro-Val-Lys-Val-Tyr-Pro-Asn-Gly-  
 14 15 16 17 18 19 20 21 22 23 24 25 26  
 -Ala-Glu-Asp-Glu-Ser-Ala-Glu-Ala-Phe-Pro-Leu-Glu-Phe-OH  
 27 28 29 30 31 32 33 34 35 36 37 38 39

- (1) Note. Physical Properties. Number of Residues: 39. Molecular Weight: 4541
- (2) Note. Physiological properties. Pituitary hormone which stimulates release of adrenal cortical steroids and induces growth of adrenal cortex. Sequence 1-13 is equivalent to alpha melanotropin.
- (3) Note. Synonyms. Adrenocorticotrophic hormone Cosyntropin, 1-39 ATCH, ATCH, Acethropan, Acortan, Acorto, Acthar, Acton, Actonar, Adrenome, Alfatrofin, Cibacthen, Corstiline, Cortiphyson, Isactid, Reactin, Solacthyl, Tubex.
- (4) Note. CA Registry Numbers of underivitized form: 9002-60-2

Mesh tree number: D.6.472.734.  
525.183

Merck Index Monograph: 9:130  
10:130

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 70 for corticotropin peptide or protein sequences.

**307 Calcitonin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

H-Cys-Gly-Asn-Leu-Ser-Thr-Cys-  
 Met-Leu-Gly-Thr-Tyr-  
 Thr-Gin-Asp-Phe-Asn-Lys-His-Thr-  
 Phe-Pro-Gin-Thr-Ala-Ile-Gly-Ala-  
 Pro-NH

- (1) Note. Physical Properties: Numbers of Residues: 32. Molecular Weight: 3,421
- (2) Note. Physiological properties. Calcium regulation hormone from thyroid gland in mammals and ultimobranchial gland in nonmammals.
- (3) Note. Synonyms. Thyrocalcitonin, Elcatonin, Ultimobranchial Body, TCA, TCT, Calcimar
- (4) Note. CA Registry Numbers of unmodified form: 9007-12-9

Mesh tree number: D.6.472.150

Merck Index Monograph: 9:1633  
10:1611

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 60 for corticotropin peptide or protein sequences.

**308 Glucagon; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure.

**Glucagon:**

His-Ser-Gin-Gly-Thr-Phe-Thr-Ser-  
 Asp-Tyr-Ser-Lys-Tyr-Leu-Asp-Ser-  
 Arg-Ala-Gin-Asp-Phe-Val-Gin-Trp-  
 Leu-Met-Asn-Thr-

- (1) Note. Physical Properties. Number Residues: 29. Molecular Weight: 3,483.

All mammalian glucagons appear to be identical.

- (2) Note. Physiological properties: Blood glucose regulatory hormone from the alpha cells of the pancreas.
- (3) Note. Synonyms. Proglucagon (69) residues MW8, 137) has been called glicentin. Glucagon, Hyperglycemic-glycosenolytic factor, HG-Factor, HGF Enteroglycagon is a glucagon like glycosenolytic peptide of intestinal tract and is called gut glucagon or oxyntomodulin.
- (4) Note. CA Registry Numbers of unmodified form: 9007-92-5

Mesh tree      Glucagon number:  
D.6.472.610.364      D19.316.629.45D

Enterglucagon  
D.6.472.317.335

D12.644.168

Merck Index Monograph:  
9:4277  
10:4307

**309      Secretin or gastrin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

**Secretin:**

His-Ser-Ap-Gly-  
Thr-Phe-Thr-Ser-Glu-Leu-Ser-Arg-  
Leu-Arg-Asp-Ser-Ala-Arg-Leu-Gin-  
Arg-Leu-Gin-Gly-Leu-Val-NH  
Gastrin:

1 10  
Pro-Gly-Pro-Trp-Leu-Glu-Glu-Glu-Glu-Glu-

11 17  
Ala-Tyr-Gly-Trp-His-Asp-Phe-

- (1) Note. Physical Properties:

	Secretin	Gastrin
Number of Residues:	27	17
Molecular Weight:	3050	2116

- (2) Note. Secretin; Physiological properties. Intestinal hormone which stimulates secretion of water and bicarbonate from the pancreas.
- (3) Note. Gastrin; Physiological properties. Stimulates gastric secretion isolated from the mucosal lining of the gastric antrum.
- (4) Note. Secretin; Synonyms. Vitram
- (5) Note. CA Registry Numbers of unmodified forms:

<b>Secretin</b>	<b>Gastrin</b>
1393-25-5	9002-76-0
<b>Mesh tree number:</b>	
D12.644.820	D12.644.224
D16.472.317.800	D6.472.317.413
D19.316.629.787	D19.316.629.441
<b>Merck Index Monograph:</b>	
9:8173	9:4209
10:8269	10:4235

<b><u>Gamicidin</u></b>	<b><u>Tyrocidin</u></b>
1405-97-6	A
	1481-70-5
	B
	8-65-28-1
	C
	325-29-7

<b><u>Gramicidin</u></b>	<b><u>Tyrocidin</u></b>
<b>Mesh tree number:</b>	
D 20.85.905.452	D 20.85.905.920
D 2085 187 925	D 20.187.925

**Merck Index Monograph:**

9:4379	9:9490
10:4405	10:9635
10:4406	

- 310 Gramicidin or tyrocidin; related peptides:**  
This subclass is indented under subclass 300.  
Peptides containing at least half the amino residues in sequence of the polypeptide with the structure:

GRAMICIDIN S cyclo (-D-Phe-L-Pro-Val-L-Orn-L-Lev-) or GRAMICIDIN A (HCO-L-Val-Gly-L-Ala-D-Leu-L-Ala-D-Val-L-Val-(L-Trp-D-Leu)<sub>3</sub>-L-Trp-NHCH<sub>2</sub>CH<sub>2</sub>OH

TYROCIDIN A cyclo (-Val-Orn-Lev-D-Phe-Pro-Phe-D-Asn-Gin-Trp-)

B Phe 6 replaced by Trp

C Phe 6 by Trp, D-Phe 7 by Trp

E Asn 8 by Asp & Trp 10 by Phe

- 311 Somatostatin (SRIF); related peptides:**  
This subclass is indented under subclass 300.  
Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

Ala-Gly-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr-Phe-Thr-Ser-Cys

- |  |  |
|--|--|
| <p>(1) Note. Synonyms. Gramodern, Pyrrolo (1, 2A) (1, 4, 7, 10, 13, 16, 19, 22, 25, 28) decaazacyclotriacontine. D is a complex of four components A, B, C, and D. A second series (the isoleucine Gramacidins) has an isoleucine instead of valine in position 1. Gramicidin B has a Phe in position II, while Gramacidin has tyrosine at this position.</p> <p>(2) Note. CA Registry Numbers of Unmodified form:</p> | <p>(1) Note. Physical Properties. Number of residues: 14. Molecular Weight: 1638</p> <p>(2) Note. Physiological properties. Inhibits secretion of pituitary growth hormone.</p> <p>(3) Synonyms. Growth hormone release-inhibiting factor, GH-RIF, somatotropin release inhibiting hormone.</p> <p>(4) Note. CA Registry Number of unmodified form: 38916-34-6</p> |
|--|--|

Ala-Gly-Cys-Lys-Asn-Phe-Phe-Trp-  
Lys-Thr-Phe-Thr-Ser-Cys

## SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 160 for somatostatin peptide or protein sequences.

**312 Melanotropin (MSH) or eledoisin; related peptides:**

Peptides under subclass 300 containing at least half the amino acid residues in sequence of the polypeptide with the structure:

(1) **Beta Melanotropin:**

Ala-Glu-Lys-Lys-Asp-Glu-Gly-  
Pro-Tyr- 1

Arg-  
10

-Met-Glu-His-Phe-Arg-Trp-  
Gly- 15

-Ser-Pro-Pro-Lys-Asp-  
20

Or is otherwise identified as alpha or beta MSH.

(2) **Eledoisin:** Pyr-Pro-Pro-Ser-Lys-  
Asp-Ala-Phe-Ile-Gly-Leu-Met.

(1) Note: Physical Properties.

Melanotropins

Alpha Beta

Eledoisins

## Number of Residues:

13 18-22

11

(2) Note. Eledoisins Physiological properties. Stimulates extravascular smooth muscle, acts as a vasodilator and hypotensive agent.

(3) Note. Melanotropins; Synonyms. Melanophore-affecting hormone; melanocyte-stimulating hormone; MSH; melanophore hormone; melanophore dilating hormone; melanophore expanding hormone; melanophore-stimulating hormone; melanotropic hormone; chromatophorotropic hormone; B-hormone; melanosome-dispersing hormone; pigmentation hormone.

(4) Note. Eledoisins; Synonyms L-Methioinamide

(5) Note. CA Registry Numbers of unmodified form:

Melanotropins

9002-79-3

Eledoisins

69-25-0

Mesh tree number:

D.6.472.734.525

D12.644.320.354

D24.185.798.354.554

D24.185.926.580.590.325

D24.185.965.590.325

Merck Index Monograph:

9:5633

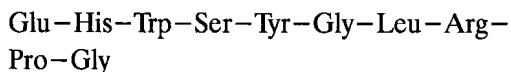
9:3491

10:5632

10:3506

**313 Lutenizing hormone-releasing factor (LRF); related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:



- (1) Note. Physical Properties. Number of Residues: 10. Molecular Weight: 1182.33.
- (2) Note. Physiological properties. Stimulates secretion of pituitary hormones LH and FSH.
- (3) Note. Lutenizing hormone-releasing hormone, LRF, LH-RH, Gonadotropin-releasing hormone, Gonadotropin-releasing factor, Luteostimulin, Luliberin, Gn-RH, Gonadoliberin, LRH, LH-FSH Releasing hormone, Nialutin, Hypothalamic Releasing factor, LHF-SHRH, Kryptocin, Lutamin.
- (4) Note. CA Registry Numbers of unmodified form: 9034-40-6

Mesh tree number D6.472.709.429

Merck Index Monograph:  
9:5318

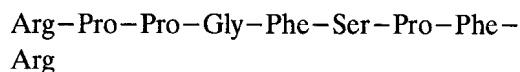
10:5306

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 130 for luteinizing hormone releasing hormone peptide or protein sequences.

**314 Bradykinin; kallidin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:



- (1) Note. Physical Properties. Number of Residues: 9. Molecular Weight: 1060.25.
- (2) Note. Physiological properties. Acts on smooth muscle, dilates peripheral vessels, increases capillary permeability. A tissue belonging to a group of hypotensive peptides known as plasma kinins.
- (3) Note. Synonyms. Kallidin I, Kallidin 9, Callidin I, L-Bradykinin, BRS640.
- (4) Note. CA Registry Number of unmodified form: 58-82-2

Kalladins

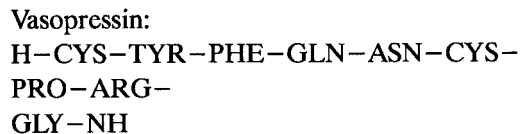
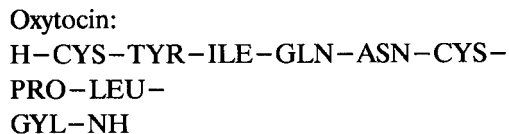
Bradykinins

Mesh Tree Number:

D12.644.320.551 D12.644.320.169  
D12.644.456.541 D12.644.456.193  
D24.185.798.354.551 D24.185.798.354.169

**315 Oxytocin; vasopressin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:



- (1) Note. Physical Properties:



**Oxytocin**                      **Vasopressin**

**Number of Residues:**

9

9

**Molecular Weight:**

1,007.23

(2) Note. Physiological properties: Oxytocin. 9aa residue hormone posterior pituitary hormone. Causes uterine contractions. Stimulates lactation. Vasopressin. 9aa residue hormone from neurohypophysis of vertebrates. Controls water metabolism. Contracts smooth muscle.

(3) Note. Synonyms: Oxytocin. Di-sipidin, alpha-Hypophamine, Pitocin, Piton S, Syntocin, Syntocinon, Uteracon, Nobitocin S, Syntocinone, Endopituitrina, Orasthin, Oxystin, 3-Isoleucine, 9 Leucine, Vasopressin, Atonin O, (1-Hemicystine) -Oxytocin, Presoxin, Hyphotocin, 1,2-Dithia-5, 8, 11, 14, 17-pentaazacycloeicosane, 8-Leucyl Vasotocin Vasopressin Tonephin, beta-Hypophamine, ADH, Antidiuretic hormone, Pitressin, ADH, (Hormone) 1 Pituitrin P, 1,2-Dithia-5-8-11-14-17 Pentaazacycloeicosane.

(4) Note. CA Registry Numbers of unmodified form:

**Oxytocin**

50-56-6

**Vasopressin**

1100-17-2

**Mesh tree numbers:**

D6.472.583.666    D6.472.734.692.781

D6.472.734.692.433 D12.644.456.925

D12.644.925.730    D19.770.896

**Merck Index Monograph:**

9:6793

9:9596

10:6849

10:9739

10:5447

10:3885

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 150 for oxytocin or vasopressin peptide or protein sequences.

### 316 **Angiotensin; related peptides:**

This subclass is indented under subclass 300. Peptides containing at least half the amino acid residues in sequence of the polypeptide with the structure:

1 2 3 4 5 6 7 8 9 10  
**Asp-Arg-Val-Tyr-Ile-His-Pro-Phe-Leu**

Angiotensin I

1 2 3 4 5 6 7 8  
**Asp-Arg-Val-Tyr-Ile-His-Pro-Phe**

Angiotensin II

(1) Note. Physical Properties.

**Angiotensin I            II**

**Number of Residues:**

10

8

(2) Note. Physiological properties: Angiotensins range in size from precursors with 14 aa's to the 8aa Angiotensin II which is a vasoconstrictor. Changes in the aa content produce antagonistic or inactive compounds.

(3) Note. Synonyms. Angiotenin, Hypertensin, angiotenin. Angiotensin 1 is the 1-10 residue of Angiotensinogen (25 residues).

(4) Note. CA Registry Number of unmodified form: 1407-47-2

**Mesh tree number:** D12.644.456.73  
D24.185.98.32

**Merck Index Monograph:** 9:683  
10:673  
10:674

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 40 for angiotensin peptide or protein sequences.

**317 Cyclic peptides:**

Peptides under subclass 300 containing at least one ring fused only through peptide bonds.

- (1) Note. The peptide bond may be other than that formed by the alpha amino nitrogen, e.g., through the 4 amino groups of 2,4 diamino butanoic acid (2,4 DAB).
- (2) Note. Cyclic compounds in which one or more links in the ring are nonpeptide bonds are called heterodectic cyclic peptides.
- (3) Note. Examples, alamethicin, amanitins, antamanide, cyclosporins, ennlatins, ferichrome, mycovbacillin, phalloidine
- (4) Note. Mesh tree number: D12.644.641

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 270 for cyclic peptides excluding those cyclic due to intrachain disulfide bonds.

**318 The cyclisation occurring through 4-amino radical of 2,4-diamino-butanoic acid:**

This subclass is indented under subclass 317. Peptides containing at least one diaminobutanoic acid residue in the peptide cycle.

- (1) Note. 2,4 diamino-butanoic acid is abbreviated Dab or DAB.

**319 Polymyxin; related peptides:**

This subclass is indented under subclass 318. Peptides containing at least half the amino acid residues of the polypeptide produced by *Bacillus polymyxa* and possessing antibiotic activity against Gram-negative bacteria.

- (1) Note. Polymyxins are heteromeric, homodetic cyclic peptides. Polymyxins designated A, B, C, D, E and M are known.
- (2) Note. Synonyms. Syno-colistin.
- (3) Note. CA Registry Number of unmodified form: 1406-11-7

**Mesh tree number:** D20.85.676

**Polymerin B** D20.85.676.768

**Merck Index Monograph:**

9:7354  
9:7355  
9:2441  
10:7441  
10:2442  
10:7446

**320 Bacitracin; related peptides:**

This subclass is indented under subclass 317. Peptides containing at least half the amino acid sequence of Bacitracin.

- (1) Note. Bacitracins are produced by various strains of *Bacillus Licheniformis* and *Bacillus subtilis*.
- (2) Note. Bacitracin. Synonyms. Ayfivin, Baciguent, Baci-Jel, Bacitek Ointment, Paretracin, Penitracin, Topitracin, Zotraacin, Baciliguin, Bacillichin. CA Registry Number of unmodified form: 1405-87-4

Mesh tree number: D20.85.119

Merck Index Monograph:

9:942

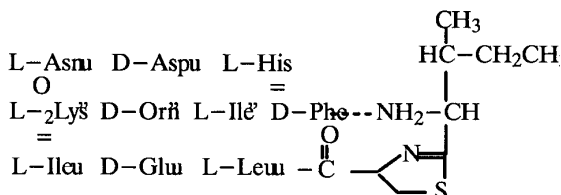
943

9784

10:937

10:938

- (4) Note. The most important of the group is bacitracin A, which contains an unusual thiazoline structure synthesized from the N-terminal isoleucine and the neighboring cysteine. Bacitracin F is a rearrangement product of bacitracin A in which the amino group of the hetero-product is oxidatively removed and the thiazoline ring system is dehydrated.



**321 Containing only normal peptide links in the ring, i.e., homodetic cyclic peptides:**

This subclass is indented under subclass 317. Cyclic peptides containing at least one ring formed by peptide bonds through only the alpha amino group of an amino acid.

**322 Peptides containing saccharide radicals, e.g., bieomycins, etc.:**

This subclass is indented under subclass 300. Peptides containing at least one saccharide radical.

(1) Note. Synonyms. Peptidoglycans.

(2) Note. Mesh tree number: D12.644.233

**323 Peptides with at least one nonpeptide bond other than a disulfide bond joining two or more sequences of amino acid residues, e.g.,**

**homomeric heterodetic peptide of other than cyclic disulfide, depsipeptides, etc.:**

This subclass is indented under subclass 300. Peptides in which a peptide chain contains an interchain nonpeptide moiety.

(1) Note.

**Homeric Heterodetic peptides**

H-Ala-Val-Ser-Ile-Phe-Leu-OH

O-Leu-Val-H

Linear branched peptide

H-Ala-Cys-Ile-Phe-Leu-OH

!

S-Leu-Val-H

Linear Branched S-peptide

H-Ala-Asp-Ser-Ile

!

Val-CO-O-Thr-OH

Heterodetic cyclic branched peptide (peptide lactone)

- (2) Note. Depsipeptide: polypeptides which contains ester bonds as well as peptide bonds. The naturally occurring Depsipeptides are usually cyclic peptides, also called peptolides, which generally have alpha or beta B-hydroxyacids as heterocomponents. This class also includes O-peptides and peptide lactones. The most important peptide lactones are the Actinomycins, Estamycin and Echionomycin; the peptolides include the Enninatins, Valinomycin, Sporidesmolides, Serratamolide, Esperrin, etc.

**SEE OR SEARCH CLASS:**

930, Peptide or Protein Sequence, subclass 30 for peptide or protein sequences with nonpeptide or abnormal peptide links.

**324 25 or more amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 25 or more amino acid residues of defined primary structure.

- (1) Note. Amino acid residues and primary structures are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight compositions or partial sequence are provided for in the generic peptide subclass.

**325 24 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising 24 amino acid residues of defined primary structures.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in the generic peptide subclass.

**326 15 to 23 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 15 to 23 amino acid residues of defined primary structure.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in the generic peptide subclass.

**327 11 to 14 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 11 to 14 amino acid residues of defined primary structure.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for the generic peptide subclass.

**328 8 to 10 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 8 to 10 amino acid residues of defined primary structure.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in the generic peptide subclass.

**329 6 to 7 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 6 to 7 amino acid residues of defined primary structure.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in the generic peptide subclass.

**330 4 to 5 amino acid residues in defined sequence:**

This subclass is indented under subclass 300. Compounds comprising from 4 or 5 amino acid residues of defined primary structure.

- (1) Note. Amino acid residue and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in the generic peptide subclass.

**331     Tripeptides, e.g., tripeptide thyroliberin (TRH) melanostatin (MIF), etc.:**

This subclass is indented under subclass 300. Compounds comprising 3 amino acid residues of defined primary structure.

- (1) Note. Amino acid residues and primary structure are discussed in the generic subclass for peptides.
- (2) Note. Peptides identified only by molecular weight composition or partial sequence are provided for in subclass 300.

**332     Containing at least one abnormal peptide link, e.g., gamma peptide bonded, etc.:**

This subclass is indented under subclass 330. Subject matter, in which the amino acid residues are joined by a peptide bond formed by other than an alpha amino acid.

- (1) Note. Glutathione would be provided for in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

317, for cyclic peptides containing at least one nonalpha amino acid peptide bond.

**333     Synthesis of peptides:**

This subclass is indented under subclass 300. Processes which a polypeptide is synthesized (1) From amino acids or protected amino acids or (2) by joining polypeptides or protected polypeptides to amino acids or protected amino acids or polypeptides or protected polypeptides.

- (1) Note. Methods of protecting or removing protective groups from peptides are included here even if the synthesis steps are nominal.
- (2) Note. This and the indented subclasses provide for patents which claim synthesis techniques not directed to producing one of the named peptides provided for in subclasses 301-316 above. The synthesis of a peptide is usually unique to that peptide and the search of the subclasses providing for the disclosed prod-

ucts of a broad synthesis process is strongly recommended.

SEE OR SEARCH CLASS:

526, Synthetic Resins or Natural Rubbers, subclass 238.1 for the formation of a synthetic resin from a protein or biologically active polypeptide where the protein or polypeptide as well as all other reactants are ethylenically unsaturated.

**334     Polymer supported synthesis, e.g., solid phase synthesis, merrifield synthesis, etc.:**

This subclass is indented under subclass 333. Processes in which synthesis includes the use of a soluble or insoluble polymer or resin covalently attached to an amino acid residue of the polypeptide chain being synthesized.

- (1) Note. This subclass includes: (a) processes of attachment of the initial amino acid or peptide to the polymer and processes of cleavage of the polypeptide product from the polymer support; (b) processes of stepwise assembly of a polypeptide in which amino acid residues are added one at a time to the polymer supported amino acid residues or peptide; (c) processes in which a polypeptide segment is added to a polymer supported polypeptide.
- (2) Note. Caution. Many patents directed to polymer supported synthesis absent a step of cleavage of the final product are originally classified in Class 525 as an after treated polymer. A complete search for polymer supported synthesis must include this class.

SEE OR SEARCH CLASS:

525, Synthetic Resins or Natural Rubbers, subclass 54.1 for the chemical reaction of a peptide or protein with a preformed resin and subclass 54.11 for processes of stepwise assembly of a polypeptide on a preformed polymer, i.e., solid phase synthesis when there is no claimed cleavage of the synthesized polypeptide.

**335 Protecting peotide functional groups or removing protective groups from peptides (e.g., protecting carboxy groups, etc.):**

This subclass is indented under subclass 333. Processes wherein a peptide group, whose purpose is to protect a functional group in a peptide, is attached to or removed from a peptide.

- (1) Note. Carboxyl group protective agents in general use include:

(a) alkyl esters that can be removed via saponification reactions (e.g., via NaOH); the tert-butyl group is a preferred carboxyl protecting group that can be removed via treatment with trifluoroacetic acid.

(b) benzyl ester, which can be removed via: (1) catalytic hydrogenation; (2) treatment with Na in liquid ammonia; or (3) saponification via NaOH

SEE OR SEARCH THIS CLASS, SUBCLASS:

334, for the protection of a functional group in a peptide, or for the removal of a protective group from a peptide, during a solid phase synthesis.

**336 Of side chain or sulfur containing group:**

This subclass is indented under subclass 335. Processes in which the addition or removal of the protective groups is to or from a side or a sulfur containing group.

- (1) Note. Protective groups of this type include -S-benzyl, -O-benzyl, and -O-*t*-butyl.

**337 Of amino group:**

This subclass is indented under subclass 335. Processes in which the addition or removal is of a protective group that protects an amino group of the peptide.

- (1) Note. Protective groups of this type include -C(=O)O-*t*-Bu (*t*-butoxycarbonyl), C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>-O-C(=O)- (benzyloxycarbonyl), and trifluoroacetyl.

**338 Solution phase synthesis:**

This subclass is indented under subclass 333. Processes in which the synthesis takes place in solution.

**339 Segment condensation, e.g., ugi condensation, etc.:**

This subclass is indented under subclass 338. Processes in which peptides of two or more amino acid residues are joined with other peptide of two or more amino acid residues to form a single large peptide.

- (1) Note. These processes are also called fragment condensation.

**340 With phosphorus containing material:**

This subclass is indented under subclass 338. Processes in which phosphorus or a phosphorus containing compound is present during synthesis.

- (1) Note. The phosphorus containing material is typically a reactant or a catalyst.

**341 With use of carbonimide or imidazole:**

This subclass is indented under subclass 338. Processes in which an imidazole or a carbonimide is present during synthesis.

- (1) Note. The use of diacyclohexylcarbodiimide as an activating agent would be included here.

**342 Mixed anhydride synthesis:**

This subclass is indented under subclass 338. Processes in which the synthesis includes (1) forming a mixed anhydride by reacting an alpha-acylamino acid or an alpha-acylamino peptide with a lower alkyl chloroformate in the presence of a tertiary amino base, and then (2) reacting the resulting free amino group or a peptide derivative having a free amino group, to form a peptide.

**343 By hydrolysis:**

This subclass is indented under subclass 333. Processes in which the synthesis includes a step of hydrolysis.

- (1) Note. The hydrolysis may be autolysis or chemical hydrolysis. The use of an enzyme or microorganism to hydrolyze a

material is provided for in Class 435, subclasses 68.1+.

### 344 Separation or purification:

This subclass is indented under subclass 300. Processes in which a pre-existing peptide is isolated from a composition.

- (1) Note. The isolation procedure may involve the chemical change or destruction of materials in the composition other than the peptide.

#### SEE OR SEARCH CLASS:

- 34, Drying and Gas or Vapor Contact With Solids, provides for processes of separating liquids from solids or slurries, i.e., drying as well as the contact of solids with either, or both, gases or vapors. If the starting material is in the form of a liquid suspension or solution even if the process is continued to the point of complete dryness, Class 159, Concentrating Evaporators, will take the process.
- 62, Refrigeration, includes processes which include removing heat by refrigeration from a substance whether solid, liquid, or vapor. In particular, Class 62, subclasses 600+ will take processes of making a solidified or liquified gaseous product provided the gas has a normal boiling point below 32 (methane, ethane, propane) and Class 62, subclasses 500+ will take processes wherein a solution or mixture is cooled to solidify a constituent which is then removed from the mixture.
- 159, Concentrating Evaporators, provides for processes peculiar to the concentration of solids held in solution or suspension by evaporation of the liquid containing them and the recovery of the concentrate. If the starting material is a solid or slurry placement in Class 34, Drying and Gas or Vapor Contact With Solids, would be indicated. Class 159 will take concentration to the point of crystallization or to dryness; however, removal of water of crystallization is considered to be a chemical reaction and placement would not be proper in Class 159.

Evaporating with subsequent vapor condensation is excluded from Class 159 and in such case, placement in Class 203, Distillation: Processes, Separatory, would be proper.

- 201, Distillation: Processes, Thermolytic, provides for processes of thermolytic distillation wherein a solid carbonaceous material is heated to vaporize a volatile portion and to cause chemical decomposition of the heated material to form different chemical substances at least some of which are volatile and leave behind a solid carbonaceous material.

- 203, Distillation: Processes, Separatory, provides for processes for separating a liquid mixture by vaporizing and condensing a portion thereof to isolate in the condensed liquid or the unvaporized portion a relatively pure compound which was present in the original mixture. The original mixture may be in a solid form so long as it melts to form a liquid before it vaporizes. A solid original mixture which undergoes chemical decomposition leaving a carbonaceous residue would be classifiable in Class 201, Distillation: Process, Thermolytic, which is superior to Class 203. Processes including a chemical reaction and separatory distillation operation are classified in Class 203 only when the chemical reaction merely facilitates the isolation by the separatory distillation operation of a preexisting substance in the distilland. See Class 260, Chemistry of Carbon Compounds, or Class 423, Chemistry of Inorganic Compounds, for a process of preparing a compound and isolating it by a separatory distillation process.

- 204, Chemistry: Electrical and Wave Energy, subclasses 456+ for gel electrophoresis.

- 210, Liquid Purification or Separation, includes processes for the separation or purification of a constituent from a flowable liquid mixture by dialysis, sorption,, ion exchange liquid extraction, gravitational separation, or filtration as well as purification of a liquid

mixture by destruction or conversion of a constituent. Processes directed to the purification of a particular compound or composition (including solution of either the compound or composition in water), are classified with the particular compound or composition. Insofar as the treatment of liquids with ion exchange or sorption materials are concerned, the following lines will be maintained.

(a) Where water is the only disclosed liquid purified, the patent will be classified in this class (210).

(b) (2) Where disclosure includes water, hydrocarbons and/or other liquids the patent will be classified: (a) In Class 210 if all claims are broad as to the liquid. (b) In Class 210 if several species of liquid are claimed and one species includes water. (c) In the appropriate art class if some liquid other than water is the only liquid claimed (e.g., mineral oils in Class 208, organic compounds in Class 260).

(c) (3) Purification or separation of liquids by flocculation only are classified in Class 210.

(d) (4) Processes wherein all claims are limited to the deposition of specific materials on ion-exchangers or sorbents with subsequent recovery of the specific materials are classified with material so operated upon.

(e) Class 210 is superior to Class 95 and takes separating processes, per se, generally disclosed or claimed as fluid separation, or if the disclosure or a claim is restricted to liquid separation.

260, Chemistry of Carbon Compounds, provides for the liberation and purification by chemical or physical means of compounds and extracts falling within the class definition of Class 260. Generally the physical processes included are of two types (a) a purification process prior or subsequent to a

chemical reaction producing a Class 260 product, (b) a purification process directed to the purification of a Class 260 compound by a combination of physical separation techniques the classes for which do not provide for or exclude the combination claimed. Chemical purification processes are generally provided for with each product produced.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 101 for apparatus for carrying out the process of this subclass.

435, Chemistry: Molecular Biology and Microbiology subclasses 68.1+ for methods of using microorganism or enzyme to liberate or purify a preexisting substance.

### 345 **Chemical aftertreatment, e.g., acylation, methylation, etc.:**

This subclass is indented under subclass 300. Processes in which a preexisting peptide is chemically modified.

(1) Note. Since the synthesis of peptide has been provided for in a superior subclass, this subclass will contain only patents directed to addition or removal of non-amino acid moieties to an existing peptide structure.

### 350 **PROTEINS, I.E., MORE THAN 100 AMINO ACID RESIDUES:**

This subclass is indented under the class definition. Subject matter in which a polypeptide is composed of more than 100 amino acid residues or has a molecular weight of greater than 10,000.

(1) Note. This subclass will provide for proteins described only in terms of physical properties such as molecular weight, electrophoretic mobility, etc.

(2) Note. Structures. The primary structure of the shorter peptides has been included in the definitions. For the proteins the Merck Monograph will often provide citation to articles disclosing the structure. The structure of the larger peptides and proteins may be found on the on-line



services by using the compound name, Chemical Abstracts Registry Number, or National Library of Medicine's MESH tree number in combination with the terms "sequence" or "structure".

- (3) Note. Compositions. In general a protein containing composition will be provided for in a class providing for the function or utility of the composition, e.g., medicine, food, Class 252 utilities, etc.

A protein mixed with a preserving agent whose sole function is to prevent chemical or physical change is provided for with the peptide or protein.

A protein derived from a single source material such as a plant or animal extract, so long as it is identified as a protein is classified in this class (530) even if a Class 424 utility is disclosed or claimed. A plant or animal extract will be provided for in Class 424 if it is (1) a single source material and (2) is of undetermined chemical constitution i.e., is claimed in terms of isolation technique or physical properties. A recitation as broad as "protein" is enough to defeat placement in Class 424 on the basis of utility.

Class 424 will provide for an additive mixture containing a protein and other ingredients if the mixture has a Class 424 utility.

- (4) Note. CAS REGISTRY NUMBERS: Chemical Abstracts Service (CAS) Registry Numbers are unique identifiers assigned to chemical substances recorded in the CAS Chemical Registry System. The CAS Registry Number itself has no chemical significance; it is simply a machine-checkable number assigned to each substance as it enters the Registry System. CAS Registry Numbers appear in CA issues and in many computer-readable files. They also may be found in several primary journals, various handbooks, and in the National Library of Medicine's TOX-LINE and CHEMLINE computer-based

information-retrieval services. For more about the CAS Chemical Registry System or Registry Numbers consult the introduction to the CAS REGISTRY HANDBOOK-Number Section.

(a) Medical Subject Headings:

(b) Mesh Tree Numbers: Mesh numbers are identifiers applied the National Library of Medicine's indexers to articles in the medical and related literature. The subject headings are Index Medicus headings and are arranged in a hierarchical matter. The abstracts and indexing are available on-line through several data base suppliers.

(c) Deleted Registry Numbers: The CAS Registry numbers found in the definitions of subclass 300 to 427 are the current registry numbers. However due to the long history and incomplete structural knowledge of peptide and protein chemistry there are usually several deleted registry numbers for each current registry number. The current registry number should be used to find the deleted numbers in the registry file and should always be included in the on-line search statement. For further information on search technique related to deleted registry numbers, see CAS ON-LINE NEWS, May/June 1984 page 5.

- (5) Note. Synthetic Resin vs. Polypeptide. The conceptual difference between the subject matter of synthetic resins provided for in the 520 series and polypeptides (including proteins) provided for in Class 530 is that the compounds of the 520 series have statistically distributed amino acid or blocks of amino acids in their molecules in a random sequence whereas 530 provides for molecules composed of a specific sequence of amino acids of defined identity and order (i.e., primary structure) having identity or close relation to a humeral or cellular polypeptide or having some humeral or cellular effect due to its ordered structure.

- (7) Note. Classification of the more common amino acids:

<u>Amino Acids</u>	<u>Classification</u>
Amino Acids commonly found in peptides and proteins:	
Alanine	562/575
Arginine	562/560
Asparagine	562/561
Aspartic acid	562/571
Cysteine	562/557
Glutaminic acid	562/573
Glycine	562/575
Histidine	548/344
Isoleucine	562/575
Leucine	562/575
Lysine	562/562
Methionine	562/559
Phenylalanine	562/445
Proline	548/535
Serine	562/567
Threonine	562/570
Tryptophan	548/496
Tyrosine	562/444
<u>Rare amino acids from proteins</u>	
Desmosine	546/335
5-Hydroxylsine	562/564
5-Hydroxyproline	548/532
Isodesmosine	546/335
3-Methylhistidine	548/335
E-N-Methyllysine	562/561
<u>Nonprotein Amino Acids</u>	
B-Alanine	562/576
V-Aminobutyric acid	562/553
Canavanine	562/560
Citrulline	562/560
B-Cyanvalanine	260/465
Djenkolic acid	562/557
Homocysteine	562/556
Homoserine	562/567
Ornithine	562/561
Valine	526/575

- (8) Note. Peptide and Protein Structure. The nature, i.e., identity, of the constituent amino acids and their sequence is referred to as the primary structure. A given primary structure will have a definite three dimensional structure which is called the secondary structure (usually helical coiling). The secondary structure of a large peptide or protein is wrapped

about and interwoven to develop the overall three dimensional structure of the molecule. This arrangement of the secondary structure is referred to as the tertiary structure and determines the allosteric properties of many proteins.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 24, 124+, 645+, and indented subclasses.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials, including inorganic or organic.
- 424, Drug, Bio-Affecting and Body Treating Compositions has the following subclasses for proteins or proteinaceous material 1.11+, for radionuclide or intended radionuclide containing; 65+, 418, 456, 460, 477+, 491+, 499, for a protein or peptide containing compositions which functions as an antiperspirant or deodorant; for a composition containing a lymphokine; 130.1+ for a composition containing an immunoglobulin, an antiserum, an antibody, or an antibody fragment; 184.1+ for a composition containing an antigen, an epitope, or another immunospecific immunoeffector that may be proteinaceous; 278.1+ for a composition containing a nonspecific immunoeffector that may be proteinaceous; 94.1+, for composition containing proteins identified as enzymes; 520+, for compositions many of which are considered to be proteinaceous; an animal extract of undetermined constitution; 115+ for compositions which may be proteins or peptides identified by elemental analysis.
- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105 for edible protein compositions or products and related process involving the same.

- 428, Stock Material or Miscellaneous Articles, for a nonstructural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses (i.e., subclass 435 and 458).
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 59.6, 537, 539, 629, 640, 642, and 643 for compositions containing proteins used in forming an image.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 68.1+ for the microbial or enzymatic synthesis of proteins and peptides; subclasses 183+ for the production of enzymes; and subclasses 174+ for the formation of immobilized enzymes and subclasses 269 and 272+ for the liberation or purification of proteins by means of microorganism or enzyme, particularly subclass 273 for the purification of collagen or gelatin.
- 436, Chemistry: Analytical and Immunological Testing, subclass 15, for a protein containing composition used as a standard or control; 16, for a blood standard; 66, for test for blood clotting factor tests; 86+, for tests for protein or peptides including sequencing methods and subclass 501 for a complement binding assays and protein binding assays and subclasses 506-548 for tests using antigen antibody interactions in a chemical test particularly subclasses 543-548 which collect methods of modifying antigens and antibodies as part of a testing procedure.
- 514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 1 through 21 and Cross-Reference Art Collections 800-809 which provide for compositions having a 424 utility containing a peptide or protein as an organic active ingredient.
- 524, Synthetic Resins or Natural Rubbers, subclasses 9+ for plant or plant derived cellular material; subclasses 17+ for proteins or biologically active polypeptide or for a process in which the protein or polypeptide is physi-  
cally mixed with a preformed resin and subclasses 70+ for a process of adding a protein or biologically active polypeptide to resin forming ingredients during reaction of the resin formers and the protein or polypeptide is nonreactive; and subclasses 21+ for animal derived proteins such as blood, particularly subclasses 22+ for Gelatin and subclasses 25+ for Casein, for a process in which the protein is physically mixed with a preformed resin.
- 525, Synthetic Resins or Natural Rubbers, subclass 54.1 for the chemical reaction of a peptide or protein with a preformed resin and subclass 54.11 for processes of stepwise assembly of a polypeptide on a preformed polymer, i.e., solid phase synthesis when there is no claimed cleavage of the synthesized polypeptide and subclass 54.24 for the chemical reaction of a flour or meal with a preformed resin.
- 526, Synthetic Resin or Natural Rubbers, subclass 238.1 for the formation of a synthetic resin from a protein or biologically active polypeptide where the protein or polypeptide as well as all other reactants are ethylenically unsaturated.
- 527, Synthetic Resins or Natural Rubbers, subclasses 100+ and 200+ for the formation of a synthetic resin by simultaneous chemical reaction of a protein cellular material (e.g., hair, horn, leather) or a protein or biologically active polypeptide and resin forming ingredient.
- 528, Synthetic Resins or Natural Rubbers, particularly subclass 328 for a polymer of amino acids and methods of making such a polyamino acid.
- 930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequences of four or more amino acids.
- 351 Lymphokines, e.g., interferons, interleukins, etc.:**  
This subclass is indented under subclass 350. Proteins which are soluble immune mediators produced by the cells of immune system.

- (1) Note. Examples. Interferon, interleukins, T Cell Growth Factor (TCGF), migration inhibitory factor (MIF), lymphotoxin (LT), macrophage factors (monokines, Mk; macrophage activation or inhibition factor, MAF).
- (2) Note. This subclass is intended to collect both lymphocyte factors (lymphokines, LK) and macrophage factor (monokines, MK).
- (3) Note. Mesh tree number: D24.611.632.

## SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclasses 140 through 145 for lymphokine peptide or protein sequences.

### 352 **Phosphoproteins, e.g., phosvitin, vitellogenin, etc.:**

This subclass is indented under subclass 350. Proteins which are conjugated proteins containing phosphate esterified with the hydroxyl group of serine or threonine residues.

- (1) Note. Casein and ovalbumin are excluded from this subclass.
- (2) Note. Mesh tree number: D12.776.744.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

358, for nuclein.  
360, for casein.  
367, for ovalbumin.

### 353 **Scleroproteins, e.g., fibroin, elastin, silk, etc.:**

This subclass is indented under subclass 350. Proteins having the structure of scleroproteins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Scleroproteins are subdivided on the basis of chain conformation into: A. alpha-helical structure, e.g., alpha-keratins; B. Beta-pleated sheet structure, e.g., Beta-keratins, silk-fibroin; C. triple helical structure, e.g., collagen. Conformation is related to amino acid composition. The

amino acid composition of Scleroproteins with Beta-pleated sheet structure shows 90 percent of the simple amino acids glycine, alanine and serine. Beta-keratin also contains a large number of cystine residues. Collagen characteristically contains high concentration of the nonhelix forming amino acid, proline and hydroxyproline.

### 354 **Gelatin:**

This subclass is indented under subclass 350. Proteins having the structure of gelatin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Gelatin is not found in nature but is derived by hydrolysis of collagen.
- (2) Note. Composition. Approximate amino acid content: glycine 25.5 percent, alanine 8.7 percent, valine 2.5 percent, leucine 3.2 percent, isoleucine 1.4 percent, cystine and cysteine 0.1 percent, methionine 1.0 percent, phenylalanine 2.2 percent, proline 18 percent, hydroxyproline 14 percent, serine 0.4 percent, threonine 1.9 percent, tyrosine 0.5 percent, aspartic acid 6.6 percent, glutamic acid 11.4 percent, arginine 8.1 percent, lysine 4.1 percent, histidine 0.8 percent. The total is over 100 percent because water is incorporated into the molecules of the individual amino acids.
- (3) Note. Synonyms. Pharmagel A or B, Spongiofort, Gelatine Gelfoam, Puragen. Older Patents use the word glue to refer to impure gelatin; these patents have been placed here arbitrarily.
- (4) Note. CA Registry Number of unmodified form: 900-70-8

Mesh tree number: D12.776.8960.476

Merck Index Monograph: 9:4217  
10:4242

## SEE OR SEARCH CLASS:

- 430, Radiation Imagery Chemistry: Process, Composition, or Products Thereof, subclasses 537 through 539, 628, 640, and 642 for compositions containing gelatin used in forming an image.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.
- 524, Synthetic Resins or Natural Rubbers, subclasses 21+ for animal derived proteins such as blood, particularly subclasses 22+ for Gelatin and 25+ for Casein, for a process in which the protein is physically mixed with a preformed resin.

**355 Separation, purification or synthesis:**

This subclass is indented under subclass 354. Processes in which gelatin is (a) isolated from a preexisting material or composition of (b) is chemically synthesized.

- (1) Note. Processes of chemical after treatment of preexisting gelatin are provided for in 354 above.
- (2) Note. See subclass 344 for a detailed description of classes providing for separation, per se.

## SEE OR SEARCH CLASS:

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid

systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**356 Collagen:**

This subclass is indented under subclass 353. Proteins having the structure of collagen and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Number of Residues: approximately 1000. Molecular Weight: about 130,000. The collagen molecule contains three peptides chains, each having about 1000 amino acids residues. Nearly one third of all the residues are glycine, with typical repeating sequences being Gly-Pro-Hyp and Gly-Pro-Ala. The chains are arranged in a triple helix and contain intramolecular cross-links. Denaturation of collagen is the conversion of the rigidly coiled helix to a random coil called gelatin.

- (2) Note. Type of Collagen

Type	Distribution
I	Skin, tendon, bone, cornea
II	Cartilage, intervertebral disc, vitreous body
III	Fetal skin, cardiovascular system
IV	Basement membrane

- (3) Note. Synonyms. Ossein, Avitene, Avicon.
- (4) Note. Sources. Hides, skin, leather hair, connective tissue.
- (5) Note. CA Registry Number of unmodified form: 9007-34-5

**Mesh tree numbers:** D12.776.860.177

**Merck Index Monograph:** 9:2442  
10:2443

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.
- 527, Synthetic Resins or Natural Rubbers, subclasses 100+ and 200+ for the formation of a synthetic resin by simultaneous chemical reaction of a protein cellular material (e.g., hair, horn, leather) or a protein or biologically active polypeptide and resin forming ingredient.

**357 Keratin:**

This subclass is indented under subclass 350. Proteins having the structure of Keratin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Characteristic properties of keratins: (a) insolubility in water, including aqueous solutions of salts, hydrotropic, substances, and dilute acids and bases at temperatures not much above room temperature; (b) resistance to proteolytic enzymes; (c) resistance to hydrolysis; (d) Lysis by mixtures of substances which break the -S-S- bonds and the hydrogen bonds.

- (2) Note. Keratins contain all the common amino acids and have a high cystine content.
- (3) Note. Sources. Horns, wool, feathers, shells, fingernail, claws, beaks, scales, whalebone (i.e., pseudokeratin).
- (4) Note. CA Registry Number of unmodified form:

**Mesh tree numbers:** D12.776.860.607

**Merck Index Monograph:** 9:5143  
10:5128

**SEE OR SEARCH CLASS:**

- 536, Organic Compounds, subclass 20 for the polysaccharide chitin.

**358 Nucleoproteins, i.e., chromatin, chromosomal proteins, histones, protamines, salmine, etc.:**

This subclass is indented under subclass 350. Proteins conjugated with nucleic acids.

- (1) Note. Upon hydrolysis nucleoproteins yield proteins and nucleic acids. Further hydrolysis of the nucleic acid fraction will yield a mixture of purine and pyrimidine bases (Adenine, Guanine, Cytosine, Thymine, Uracil), sugars (ribose or deoxyribose) and phosphoric acid.
- (2) Note. Casein for purposes of this class is excluded from nucleoproteins.
- (3) Note. Examples. Chromatin, Heterochromatin, nucleosomes, histone and nonhistone chromosomal proteins, clupeine, salmine, ribonucleoproteins
- (4) Note. Mesh tree number: D12.776.664

**Merck Index Monograph:** 9:6537  
10:6570

**359 Lipoproteins, e.g., egg yolk proteins, cyclomicros, etc.:**

This subclass is indented under subclass 350. Proteins which are conjugated with a lipid.

- (1) Note. Lipids include complex lipids which contain fatty acids as components (e.g., acylglycerols, phosphoglycerides, sphingolipids, etc.) and the simple lipids (terpenes and steroids).
- (2) Note. This subclass provides for lipoprotein systems, i.e., transport lipoproteins and membrane systems, in which the lipid and protein are held together by hydrophobic interactions between the nonpolar portions of the lipid and protein components.
- (3) Note. Synonyms. Apolipoprotein-serine, Lipoprotein C1, Vitellogenin, Proteolipids, Apolipoproteins.
- (4) Note. CA Registry Number: 53570-63-1

**Mesh tree Number: D10:516.532**  
**D12.776.521**

**360 Casein or caseinate:**

This subclass is indented under subclass 350. Proteins having the structure of casein and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. (Bovine)

**Number of Residues:**

Alpha-S1	Alpha-S2	Beta
Kappa		
199	207	209 169

**Molecular Weight:**

22,974	24,331	23,582	18,943
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- (2) Note. Source. Produced in mammary tissue from amino acids supplied by the

blood. Obtained from milk by removing the cream and acidifying the skimmed milk which causes casein to precipitate. In cheese manufacture, casein is precipitated by the lactic acid formed from the same milk by rennet is favored for casein intended for plastics manufacture.

- (3) Note. Synonyms. Prototflex, Protatflex, FN4, FN5
- (4) Note. CA Registry Number of unmodified form: 9000-71-9\*

**Mesh tree number:**  
**D12.776.256.626.207**

**Merck Index Monograph: 9:1879**  
**10:1866**

- (5) Note. Milk proteins includes albumins, caseins and lactoglobulins.

**SEE OR SEARCH CLASS:**

- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 59.6, 537, 539, 628, 640, 642, and 643 for compositions containing casein used in forming an image.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.
- 524, Synthetic Resins or Natural Rubbers, subclasses 21+ for animal derived proteins such as blood, particularly subclasses 22+ for Gelatin and 25+

for Casein, for a process in which the protein is physically mixed with a proformed resin.

**361 Separation, purification or synthesis:**

This subclass is indented under subclass 360. Processes in which casein (1) is isolated from a preexisting material or composition or (2) is chemically synthesized.

(1) Note. Processes of chemical after treatment of preexisting casein is provided for in 360 above.

(2) Note. See subclass 345 for a detailed description of classes providing for separation, per se.

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**362 Albumin:**

This subclass is indented under subclass 350. Proteins having the structure of albumin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. Physical Properties: A group of proteins characterized by heat coagulability and solubility in dilute salt solution.

(2) Note. Grain and soybean albumins, as well as all plant albumins are excluded from this subclass and provided for in subclasses 370+.

(3) Note. Albumin refers to egg white or dried egg white. Albumin contains 75 percent ovalbumin, ovoconalbumin, ovomucoid, ovomucin, ovoglobulin, lysozyme and avidin.

(4) Note. Mesh tree number: D12. 776.34

**Merck Index Monograph: 9:203  
10:203**

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**363 Serum albumin, e.g., BSA, HSA etc.:**

This subclass is indented under subclass 363. Proteins having the structure of serum albumin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. Physical Properties: Molecular Weight: about 69,000 structure consists of carbohydrate-free polypeptide chain connecting four globular segments of unequal size stabilized by seventeen S-S bridges.

(2) Note. Physiological properties. Involved in osmotic regulation and the transport of sparingly soluble metabolic products from one tissue to another, especially in the transport of free fatty acids.



- (3) Note. Synonyms. Albumin, from blood; Albuminate; Albuminar; Albumisol; Albuspan; Buminate; Pro-Bumin; Proserum.

- (4) Note. CA Registry Number: 9048-46-8\*

Mesh tree number: D12.776.34.841  
D12.776.124  
D12.776.124.727

Merck Index Monograph: 7z9:8212  
10:8307

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**364 Separation, purification or synthesis:**

This subclass is indented under subclass 363. Processes in which serum albumins (a) is isolated from a preexisting material or composition or (b) is chemically synthesized.

- (1) Note. Processes of chemical after treatment of preexisting serum albumin are provided for in subclass 363 above.
- (2) Note. See subclass 344 for a detailed description of classes providing for separation, per se.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes

of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**365 Lactalbumin, e.g., milk source, etc.:**

This subclass is indented under subclass 362. Proteins having the structure of lactalbumin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties: Alpha lactalbumin (Bovine). Number of Residues: 123. Molecular Weight: 14,183.
- (2) Note. Physiological properties. Alpha-lactalbumin is related to animal lysozymes.
- (3) Note. Synonyms.
- (4) Note. CA Registry Number of unmodified form: 12585-12-5

Mesh tree number:

D12.776.34.398  
D12.776.256.626.506

**SEE OR SEARCH CLASS:**

- 426, Food or Edible Material: Processes Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105, for edible protein compositions or products and related process involving the same.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes

of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

### 366 Separation, purification or synthesis:

This subclass is indented under subclass 365. Processes in which lactal albumin (a) is isolated from a preexisting material or composition or (b) is chemically synthesized.

- (1) Note. Processes of chemical after treatment of preexisting lactal albumins are provided for in 365 above.
- (2) Note. See subclass 344 for a detailed description of classes providing for separation, per se.

#### SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

### 367 Ovalbumin, e.g., avidin, conalbumins, etc.:

This subclass is indented under subclass 362. Proteins having the structure of ovalbumin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Numbers of residue: 400. Molecular Weight: 45,000. Structure is a complex protein consisting of a single polypeptide chain of about 400 residues, a minimum of two phosphate residues per mole, and an oligo-saccharide side chain composed of only mannose and glucosamine residues.
- (2) Note. Source. Ovalbumin, comprises 75 percent of the protein of egg white from hen's eggs where it occurs with avidin, lysozyme, conalbumin and ovomacoid.
- (3) Note. Synonyms: egg albumin, ovalbumin
- (4) Note. CA Registry Number of unmodified form:

#### Mesh tree number:

Ovalbumin  
Conalbumin  
D12.776.34.614  
D12.776.34.180  
D12.776.256.317.663  
D12.776.256.317.180

#### Merck Index Monograph:

9:6736  
10:6775

- (5) Note. Physical Properties. Chicken Avidin. Number of Residues: 128. Molecular Weight: 14,332 structure is a glycoprotein containing four essentially identical subunits: With a combined molecular weight of about 66,000. Each subunit is a single polypeptide chain containing 128 amino acid residues with alanine at the N-terminal, glutamic acid at the C-terminal, and a carbohydrate moiety attached at the asparaginyl residue position 17.
- (6) Note. Avidin. Source. Isolated from raw egg white protein of eggs of birds and amphibia.

- (7) Note. Avidin CA Registry Number of form:

**Mesh tree number:**

D12.776.34.614.300  
D12.776.256.317.663.300  
D12.776.395.175

**Merck Index Monograph:**

9: 906

10: 893

**SEE OR SEARCH CLASS:**

- 426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105 for edible protein compositions or products and related process involving the same.
- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**368 Separation, purification or synthesis:**

This subclass is indented under subclass 367. Processes in which ovalbumins (a) is isolated from a preexisting material or composition or (b) is chemically synthesized.

- (1) Note. Processes of chemical after treatment of preexisting of ovalbumins are provided for in 367 above.
- (2) Note. See subclass 344 for a detailed description of classes providing for separation, per se.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**369 Separation, purification or synthesis:**

This subclass is indented under subclass 362. Processes in which albumin (a) is isolated from a preexisting material or composition or (b) is chemically synthesized.

- (1) Note. See subclass 344 for a detailed description of classes providing for separation, per se.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**370 Plant proteins, e.g., derived from legumes, algae or lichens, etc.:**

This subclass is indented under subclass 350. Proteins derived from green or nongreen plants.

(1) Note. Examples. abrin, chloroplast coupling factor, concanavalin A, ferredoxins, ricin, plastocyanin phytochrome.

(2) Note. Mesh tree number:D12.776.691, D12.776.765

**SEE OR SEARCH CLASS:**

426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105 for edible protein compositions or products and related process involving the same.

435, Chemistry: Molecular Biology and Microbiology, subclasses 257.1+ for subject matter involving algae including processes and compositions for their propagation, etc.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

930, Peptide or Protein Sequence, subclass 230 for multicellular plant derived peptide or protein sequences.

**371 Derived from fungi, e.g., yeasts, mushroom, etc.:**

This subclass is indented under subclass 370. Plant proteins which are isolated or extracted from fungi or from a fraction or isolate of fungi.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclasses 254.1+ for subject matter involving fungi and yeast including processes and compositions for their propagation, etc.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**372 Derived from grain, e.g., prolamines, etc.:**

This subclass is indented under subclass 370. Plant proteins which are isolated or extracted from grain or from a fraction or isolate of grain.

(1) Note. Grain includes: Wheat, rye, oats, barley, treficale, corn, rice, maize and products made from grains such as flours, peeled grains, germ, etc..

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

524, Synthetic Resins or Natural Rubbers, subclass 47 for the use of a farinaceous material such as wheat as a physical additive to a preformed resin.

525, Synthetic Resins or Natural Rubbers, subclass 54.24 for the chemical reaction of a flour or meal with a preformed resin.

**373 Zein:**

This subclass is indented under subclass 372. Proteins having the structure of zein and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Molecular Weight: greater than 38,000
- (2) Note. Zein is the product of extracting gluten meal with dilute isopropanol.
- (3) Note. CA Registry Number: 9010-66-6\*

Mesh tree number:  
D12.776.765.919

Merck Index Monograph: 9:9779  
10:9921

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**374 Gluten or gliadin:**

This subclass is indented under subclass 372. Proteins having the structure of Gluten or Gliadin and compounds derived from these by addition or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. For the structure of Gluten see Pance et al, Cereal Chemistry, Vol. 27, page 335 (1950).
- (2) Note. Gluten is a protein isolate from wheat intermixed with the starchy

endosperm of the grain. Gliadin is a prolamine derived from grain containing up to 43 percent glutamine.

- (3) Note.

**Gluten Gliadin****Mesh tree number:**

D12.776.765.412  
D12.776.765.412.400

**Merck Index Monograph:**

9: 4308  
9: 4249  
10:4337  
10:4298

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**375 Derived from wheat:**

This subclass is indented under subclass 372. Plant proteins which are isolated or extracted from wheat or from a fraction or isolate of wheat.

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid

- systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.
- 524, Synthetic Resins or Natural Rubbers, subclass 47 for the use of a farinaceous material such as wheat as a physical additive to a preformed resin.

**376 Derived from corn:**

This subclass is indented under subclass 372. Plant proteins which are isolated or extracted from corn or from a fraction or isolate of corn.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**377 Derived from oil seed, e.g., cotton seed, rapeseed, sunflower, etc.:**

This subclass is indented under subclass 370. Plant proteins which are isolated or extracted from oil seed or from a fraction or isolate of oil seed.

- (1) Note. Included as oil seeds are: castor bean; cotton seed; flax seed; hemp seed; linseed; navy bean; peanut; pinto bean; rape seed; sesame seed; soybeans; sunflower seed

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes

of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**378 Derived from soybean:**

This subclass is indented under subclass 377. Plant proteins which are isolated or extracted from soybean or from a fraction or isolate of soybean.

**SEE OR SEARCH CLASS:**

- 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**379 Derived from leafy green plants, e.g., alfalfa pollen, etc.:**

This subclass is indented under subclass 370. Plant proteins which are isolated or extracted from leafy green plants or from a fraction or isolate of leafy green plants.

- (1) Note. Included as leafy green plants are: alfalfa; beet foliage; celery; cabbage; kale; lettuce; silage; spinach. Also included is the juice from crushed green plants, and pollens extracted from grass.
- (2) Note. Pollen is arbitrarily included here regardless of source.

## SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 77+ for colloid systems of colloid-sized solid phase dispersed in aqueous continuous liquid phase, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates); or agents for such systems or making or stabilizing such systems or agents; in each instance, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**380 Blood proteins or globulins, e.g., proteoglycans, platelet factor 4, thyroglobulin, thyroxine, etc.:**

This subclass is indented under subclass 350. Proteins identified as Blood Proteins or Globulins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. This subclass includes transcobalamins, thrombosthenin, macroglobulin, microglobulin, lactoglobulin, thromboglobulin as well as serum or plasma proteins.

(2) Note. Protein found in human plasma include:

Prealbumin

Albumin

Alpha<sub>1</sub>-Lipoprotein

Alpha<sub>1</sub>-Acid glycoprotein

Alpha<sub>1</sub>-Antitrypsin

Alpha<sub>1</sub> Glycoprotein

Transcortin

4.6S-Postalbumin

Alpha<sub>1</sub>-glycoprotein

Thyroxin-binding globulin

Inter-alpha-trypsin-inhibitor

GC-globulin

Haptoglobin

Ceruloplasmin

Cholinesterase

Alpha<sub>2</sub>-Lipoproteins(s)

Alpha<sub>2</sub>-Macroglobulin

Alpha<sub>2</sub>-HS-glycoprotein

Zn-Alpha<sub>2</sub>-glycoprotein

Alpha<sub>2</sub>-Neuramino-glycoprotein

Erythropoietin

Beta-lipoprotein

Transferrin

Hemopexin

Fibrinogen

Plasminogen

Beta<sub>2</sub>-glycoprotein I

Beta<sub>2</sub>-glycoprotein II

Immunoglobulin G

(IgG) or Gamma G-globulin

Immunoglobulin A (IgA) or Gamma A-globulin

Immunoglobulin M

(Iga) or Gamma M-globulin

Immunoglobulin D (IgD) or Gamma D-Globulin	<u>International designation</u>	<u>Name</u>
	I	Fibrinogen
	II	Prothrombin
Immunoglobulin E (IgE) or Gamma E Globulin	IIa	Thrombin
	III	Tissue thromboplastin
Free K and Gamma light chains	V and VI	Proaccelerin, accelerat or globulin
Complement factors	VII	Proconvertin
	VIII	Antihemophilic globulin (AHG)
(3)Note.	IX	Christmas Factor, plasma thromboplastin component (PTC)
	X	Stuart-Prower factor, autoprothrombin III
<b>Blood Protein Globulins</b>	IX	Plasma thromboplastin antecedent (PTA)
<b>Mesh tree number:</b>	XII	Hagemann Factor
D12.776.124	XIII	Fibrin-stabilizing factor
D12.776.377		

## SEE OR SEARCH CLASS:

426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105 for edible protein compositions or products and related process involving the same.

524, Synthetic Resins or Natural Rubbers, subclasses 21+ for animal derived proteins such as blood, particularly subclasses 22+ for Gelatin and 25+ for casein, for a process in which the protein is physically mixed with a pre-formed resin.

**381 Blood coagulation factors and fibrin, e.g., thromboplastin, etc.:**

This subclass is indented under subclass 350. Proteins identified as Blood Coagulation Factors or fibrin and compounds derived from these by addition to or deletion of parts of polypeptide structure.

(1) Note. Important blood clotting factors include:

(2) Note. Examples, Blood Coagulation Factor XIII, Laki-Lorand Factor, Fibrin-stabilizing Factor, Fibrinase.

(3) Note. CA Registry Number of unmodified form:

**Factor XIII****XIIIa****9013-563****9067-75-8****Coagulation factors Fibrin****Mesh tree Number:**

D12.776.124.125 D12.776.124.270

D19.461.270.229 D19.461.270.463.400

**Merck Index Monograph:****9:3862 through 3869****10:3862 through 3869**

## SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontin-



uous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**382 Fibrin or fibrin intermediates, e.g., fibrinogen etc.:**

This subclass is indented under subclass 381. Proteins having the structure of fibrin and compounds derived for these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties:

Alpha Beta Gamma  
Fibrinogen  
chain chain chain

2564 610 461 411  
340,000  
66,115 52,314 46,468

- (2) Note. Fibrinogen is a hexamer of two sets of three nonidentical chains linked by disulphide bonds.
- (3) Note. Example. Fibrinogen, Fibrinopeptide A (19 residues MW 1,892), antihemophilic globulin IX, Blood Clotting Factor I, Parenogen.
- (4) Note. CA Registry Number: Fibrin

9001-31-4\*

Mesh tree number:  
D12.776.124.270

D19.461.270.463.400

Merck Index Monograph: 9:3990  
through 3992

10:3999 through 4000

**SEE OR SEARCH CLASS:**

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**383 Blood coagulation factor VIII, AHF:**

This subclass is indented under subclass 381. Proteins having the structure of and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties: Molecular Weight: over 1,000,000
- (2) Note. Physiological properties: Involved in the formation of thromboplastin by the activation of factor X.
- (3) Note. Synonyms: Antihemophilic factor A, Thromboplastinogen, AHF-A Factor VIII, Antihemophilic A Factor, Factorate, Ristocetin cofactor, Blood platelet aggregating factor, Ristocetin, von Willebrand factor, antihemophilic globulin (AHG).
- (4) Note. CA Registry Number:

thromboplastin in the presence of calcium ions.

### VIII VIIIa

9001-27-8

72175-66-7

Mesh tree number:

D12.776.124.125.350

D19.461.270.229.369

Merck Index Monograph:

9:3864

10:3864

(3) Note. Factor II. Synonyms. Prothrombin fragment 2, factor II prothrombase, serozyme, thrombogen.

(4) Note. Factor II CA Registry Number: 9070-19-3

Mesh tree number: D8.444.709

D19.776.124.125.800

D19.461.270.229.740

D19.461.270.792

### SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

930, Peptide or Protein Sequence, subclass 100 for Factor VIII peptide or protein sequences.

Merck Index Monograph:

9:3864

10:7790

(5) Note. Synonyms. Prothrombin complex components.

### Factor

VII. Proconvertin

VII.a

E.C.3.4.21.21

### 384 Blood coagulation FACTOR II, or factor II + VII + IX +, i.e., PROTHROMBIN OR prothrombin complex or factor:

This subclass is indented under subclass 381. Proteins having the structure of factor II and or prothrombin complex and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. Factor II Physical Properties. Number of Residues: 582. Molecular Weight: 68,900

(2) Note. Factor II Physiological Properties. An inactive plasma zymogen which is converted to thrombin (factor IIa) by

IX. Antihemophilic factor B, Christmas factor, plasma thromboplastin component, PTC, AHF-B

X. Stuart factor, Stuart-Power factor, Prethrombokinese

Xa. Autoprothrombin C, Thrombokinese, Thromboplastin

- (6) Note. Prothrombin complex components.

CA Registry Number:

VII 9001-25-6VIIa

65312-43-8I

X 900-28-9

X 9070-18-2

Xa 9002-05-5

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is hierarchically superior provision in the USPC for the specifically claimed art.

**385 Hemoglobins or globins:**

This subclass is indented under subclass 380. Proteins having the structure of hemoglobins or globins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties. Globin from normal adult human hemoglobin consists of four polypeptide chains: two alpha-chains and two beta-chains. The alpha-chain contains 141, the beta-chain 146 amino acids. Abnormal globins may contain gamma and delta-chains.

**HEMOGLOBIN**

Human <u>alpha chain</u>	Beta <u>chain</u>	Delta <u>chain</u>	Epsilon <u>chain</u>
141	146	146	146
	15,867	15,924	16,072

Globin

Number of Residues: 574

Molecular Weight: about 62,000

- (2) Note. Physiological properties. At pH values near neutrality, combines with ferroporphyrin to yield hemoglobin, or with ferriprotoporphyrin yield methemoglobin.
- (3) Note. Examples. Leshemoglobins, Uteroglobins. Hemoglobin Synonyms: Blood pigments, Ferrohoglobins Hbs, Hb, Deoxyhemoglobins, Eryhem, Erythrocrorins carboxyhemoglobin.
- (4) Note. CA Registry Number of Hemoglobins: 9008-02-0\*

Mesh tree number:  
D12:776.124.400  
D12.776.422.512

**Merck Index Monograph:**

Globin: 9: 4276 10: 4306  
Hemoglobin 9: 4505 10: 4538  
Methemoglobin 9: 5824 10: 5827

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
400, for myoglobins.

SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology or Microbiology, appropriate subclass for lysozyme which is sometimes denominated globulin G<sub>1</sub>.

- 540, Organic Compounds, subclasses 145+ for heme, the oxygen carrying prosthetic group of hemoglobin and myoglobin which is a substituted porphyrin.

### 386 Globulins:

This subclass is indented under subclass 380. Proteins identified as globulins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties: Proteins which are insoluble in water at their isoelectric point are classified as globulins. The term "isoelectric point" is the pH at which a globulin will not migrate to either the cathode or anode when a direct current is passed through an aqueous suspension or dilute salt solution of the globulin.
- (2) Note. Physiological properties. This group includes many enzymes and most glycoproteins. Enzymes are provided for in Class 435, Chemistry: Molecular Biology and Microbiology.
- (3) Note. Examples, Euglobulins, Pseudoglobulins.
- (4) Note.

#### Mesh tree number:

#### Serum Globulins    Thryoglobulin

##### Globuins

D12.776.124.790

D12.776.377.856 D12.776.377

D12.776.377.715

D2.776.395.768

D12.776.468.706

### 387.1 Immunoglobulin, antibody, or fragment thereof, other than immunoglobulin, antibody, or fragment thereof that is conjugated or adsorbed:

This subclass is indented under subclass 386. Subject matter in which the protein has the structure of an immunoglobulin, antibody, or fragment thereof that is not conjugated or adsorbed to another substance.

- (1) Note. This subclass includes immunoglobulins or gamma globulins (except monoclonal antibodies) whose binding specificities are not disclosed, and methods of purifying immunoglobulins, except those methods provided for in subclasses 390.1 and 390.5. Patents pertaining generically to monoclonal antibodies whose binding specificities are not disclosed are classified in subclasses 388.1 or 388.15.
- (2) Note. Immunoglobulins may be monoclonal or polyclonal. Monoclonal antibodies are identical antibody molecules produced by a clone of cells or cell line that is derived from a single antibody-producing cell, or are antibody molecules that have otherwise been made identical. Polyclonal antibodies or immunoglobulins are mixtures of antibodies produced by multiple cells or clones of cells that produce antibody molecules that are not identical to each other, but which may bind different antigenic determinants or epitopes on the same molecule.
- (3) Note. Antibodies are assumed to be polyclonal unless they are specifically characterized as being monoclonal, or if they are secreted by a single cell line or cell clone.
- (4) Note. The major classes of immunoglobulins are IgG, IgM, IgA, IgD, and IgE. Subclasses of immunoglobulins also exist, notably the IgG<sub>1</sub>, IgG<sub>2a</sub>, IgG<sub>2b</sub>, IgG<sub>3</sub>, and IgG<sub>4</sub> subclasses comprising the IgG class. IgY is similar to IgG and is found only in birds.
- (5) Note. Synonyms are immune globulin, gamma globulin, Ig, etc.

#### SEE OR SEARCH THIS CLASS, SUBCLASS:

- 391.1+, for antibodies or antisera or fragments thereof that are conjugated or adsorbed to other substances.
- 407, for methods of hydrolysis of proteins.
- 828, for cancer-associated proteins.

- 829, for blood proteins, including immunoglobulins.
- 830, for plasma or serum proteins, including immunoglobulins.
- 831, for immunoglobulins and other proteins isolated via the Cohn fractionation method.
- 832, for immunoglobulins isolated from milk or colostrum.
- 833, for immunoglobulins isolated from whey.
- 851, for immunoglobulins isolated from placental extracts.

**SEE OR SEARCH CLASS:**

- 424, Drug, Bio-Affecting and Body Treating Compositions, for compositions intended for class defined uses such as in vivo diagnosing (e.g., imaging), methods of making such compositions, and nominal methods of using such compositions, see subclasses 1.49+ for compositions comprising radiolabelled antibody, or antibody fragment, or immunoglobulin, subclasses 9.3+ and 9.4+ for testing compositions, and subclasses 130.1+ for body-treating compositions containing an immunoglobulin, an antiserum, an antibody, or an antibody fragment.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 4+, particularly subclasses 7.1+ for antibodies used in immunological testing involving a microorganism or an enzyme; subclass 188 for antibodies conjugated to enzymes; and subclass 188.5 for catalytic antibodies.
- 436, Chemistry: Analytical and Immunological Testing, subclass 15 for protein-containing compositions used as standards or controls; subclass 16 for blood standards; subclass 66 for tests for hemoglobin or myoglobin; subclass 69 for tests for blood clotting factors; subclasses 86+ for tests for proteins or peptides, including sequencing methods; subclass 501 for complement binding assays or protein binding assays; and subclasses 506-548 for tests using antigen-antibody interactions in a chemical test, particularly subclasses 543-548, which collect methods of modifying antigens

and antibodies as part of a testing procedure.

- 514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 1 through 21 and Cross-Reference Art Collections 800-809 which provide for compositions having a Class 424 utility containing a peptide or protein as an organic active ingredient.
- 525, Synthetic Resins or Natural Rubbers, subclass 54.1 for antibodies chemically bound to synthetic resins.

**387.2 Anti-idiotypic:**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or antibody fragment that binds another antibody at one of its idiotopes.

- (1) Note. An idiotope is an antigenic determinant in the variable region of the antibody.
- (2) Note. An idio type is that set of idiotopes characteristic of a particular antibody.
- (3) Note. "Internal image" antibodies are a subset of anti-idiotypic antibodies that mimic the antigen in their ability to elicit antibodies that bind said antigen.
- (4) Note. It is suggested that the patents in this subclass be cross-referenced to the appropriate subclass(es) that provide for the binding specificity of the antibodies bound by the anti-idiotypic antibodies, if disclosed.

**387.3 Chimeric, mutated, or recombined hybrid (e.g., bifunctional, bispecific, rodent-human chimeric, single chain, rFv, immunoglobulin fusion protein, etc.):**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or antibody fragment altered with respect to its amino acid sequence; with respect to its composition of heavy and light chains or immunoglobulin domains; or with respect to its glycosylation, as compared with that found in nature; or involving an antibody or antibody fragment fused to a nonimmunoglobulin amino acid sequence.

- (1) Note. Chimeric and recombined hybrid antibodies comprise amino acid

sequences derived from two or more nonidentical immunoglobulin molecules--e.g., interspecies combinations, etc.

- (2) Note. Chimeric, mutated, and recombined hybrid antibodies may be made either by chemical alteration of existing antibodies or by the expression of cloned genes for altered or recombined antibodies. Glycosylation of the antibody molecules may be altered when expressed in host cells of species other than their own.
- (3) Note. It is suggested that the patents of this subclass be cross-referenced to the appropriate subclass(es) that provide for the binding specificity of these antibodies, if disclosed.

### **387.5 Binds oligosaccharide structure:**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an oligosaccharide structure that is either free, a component of a glycoprotein, or a component of a glycolipid.

- (1) Note. The oligosaccharide structure can be one that is schematically illustrated in the disclosure or one that is known in the art, such as the carbohydrate component of ganglioside GD3.
- (2) Note. Some of the oligosaccharide structures disclosed by the patents of this subclass are expressed on the surfaces of cancer cells as components of glycoproteins or glycolipids and are related to the A, B, Le, or H blood-group antigens.
- (3) Note. It is suggested that the patents in this subclass be cross-referenced to the appropriate subclass(es) that provide for antibodies that bind the microorganism(s) upon which the oligosaccharide structure is expressed, if such disclosure is present.

### **387.7 Binds expression product of cancer-related gene or fragment thereof (e.g., oncogene, proto-oncogene, etc.):**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an expression product or fragment thereof of a cancer-related gene, such as an oncogene or proto-oncogene.

- (1) Note. An oncogene is a genetic sequence whose expression transforms a normal cell into a cancerous cell. A proto-oncogene is a genetic sequence found in a noncancerous cell which, when mutated in a characteristic way, can become an oncogene.

### **387.9 Binds specifically-identified amino acid sequence:**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a protein or peptide antigen or antigenic determinant whose amino acid sequence is disclosed.

- (1) Note. It is suggested that the patents in this subclass be cross-referenced to the subclass(es) that provide for antibodies that bind the antigen or antigenic determinant that the disclosed sequence comprises.

### **388.1 Monoclonal:**

This subclass is indented under subclass 387.1. Subject matter involving an antibody or fragment thereof produced by a clone of cells or cell line that is derived from a single antibody-producing cell, wherein said antibody is identical to all other antibodies produced by that clone of cells or cell line.

- (1) Note. This subclass provides for antibodies and fragments thereof that are produced by any cloning technology that yields identical molecules, e.g., hybridoma technology, recombinant DNA technology, etc.
- (2) Note. Monoclonal antibodies are sometimes termed monoclonal receptors.

- (3) Note. This subclass includes monoclonal antibodies whose binding specificities are not disclosed and includes methods of purifying monoclonal antibodies, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:

808+, for cell lines producing monoclonal antibodies.

SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology and Microbiology, subclasses 326+ for an animal cell, per se, which expresses immunoglobulin, antibody, or fragment thereof.

### **388.15 Human:**

This subclass is indented under subclass 388.1. Subject matter involving a monoclonal antibody or fragment thereof derived from a human source, or whose amino acid sequence is identical to that found in humans.

### **388.2 Binds microorganism or normal or mutant component or product thereof (e.g., animal cell, cell-surface antigen, secretory product, etc.):**

This subclass is indented under subclass 388.1. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a micro-organism, or with a substance shed or secreted by a micro-organism, or with a chemically-altered component of a microorganism, or with a chemically-altered substance shed or secreted by a micro-organism.

- (1) Note. A micro-organism, for the purpose of this and indented subclasses, is a cell of a multicellular organism, a single-celled organism, a virus, or other intracellular organism.
- (2) Note. A mutant or chemically-altered component or product of a micro-organism may be made by chemical synthesis or chemical modification or by expression of a cloned altered gene.

- (3) Note. Monoclonal antibodies or fragments thereof that bind a mutant or chemically-altered component or product of a micro-organism are proper for the subclass that provides for monoclonal antibodies that bind the corresponding normal component or product.

### **388.21 Binds nucleic acid or derivative or component thereof (e.g., DNA, RNA, DNA-RNA hybrid, nucleotide, nucleoside, carcinogen-DNA adduct, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a nucleic acid; a component of a nucleic acid, such as a nucleotide or nucleoside; or a modified nucleic acid, such as carcinogen-DNA adduct resulting from exposure to a carcinogen.

- (1) Note. An adduct is an addition group or compound.

### **388.22 Binds receptor (e.g., transferrin receptor, Fc receptor, dihydropyridine receptor, IL-2 receptor, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a free or micro-organism-associated receptor.

- (1) Note. A receptor is a structure integral to a micro-organism or released into the surrounding milieu that has binding specificity for a particular three-dimensional structural configuration of a molecule or portion thereof.
- (2) Note. For the purpose of this subclass, an antibody is not considered a receptor. Patents disclosing non-anti-idiotypic monoclonal antibodies or fragments thereof that bind other immunoglobulins are proper for subclass 388.25, unless the monoclonal antibodies specifically bind lymphocyte-bound immunoglobulins, in which case the patents are proper for subclass 388.73.

**388.23 Binds lymphokine, cytokine, or other secreted growth regulatory factor, differentiation factor, or intercellular mediator specific for a hematopoietic cell (e.g., interleukin, interferon, erythropoietin, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a lymphokine, cytokine, or any other secreted growth stimulatory factor, growth inhibitory factor, differentiation factor, or intercellular mediator that targets any type(s) of hematopoietic cells.

- (1) Note. The term “growth regulatory factor” is meant to encompass any secretory factor that is growth-stimulatory or growth-inhibitory; i.e., that will stimulate or inhibit clonal expansion of cells.
- (2) Note. The term “differentiation factor” is meant to encompass any secretory factor that causes cells to progress from a relatively undifferentiated state to a more differentiated state, wherein said progression may include clonal expansion.
- (3) Note. The term “intercellular mediator” is meant to encompass any secretory factor that affects cellular functions such as chemotaxis, etc.
- (4) Note. See Patent Classification Definitions for Class 424, subclass 85.1, for examples of lymphokines and cytokines.
- (5) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells, including cells at any stage of differentiation from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

**388.24 Binds hormone or other secreted growth regulatory factor, differentiation factor, intercellular mediator, or neurotransmitter (e.g., insulin, human chorionic gonadotropin, intragonadal regulatory protein, mullerian inhibiting substance, inhibin, epidermal**

**growth factor, nerve growth factor, dopamine, norepinephrine, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a neurotransmitter, with a hormone, or with any other secreted growth regulatory factor, differentiation factor, or intercellular mediator that targets cells other than hematopoietic cells.

- (1) Note. The term “growth regulatory factor” is meant to encompass any secretory factor that is growth-stimulatory or growth-inhibitory; e.g., that will stimulate or inhibit clonal expansion of cells.
- (2) Note. The term “differentiation factor” is meant to encompass any secretory factor that causes cells to progress from a relatively undifferentiated state to a more differentiated state, wherein said progression may include clonal expansion.
- (3) Note. The term “intercellular mediator” is meant to encompass any secretory factor that affects cellular functions such as chemotaxis, etc.

**388.25 Binds plasma protein, serum protein, or fibrin (e.g., clotting factor, fibrinolytic factor, complement factor, immunoglobulin, apolipoprotein, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a plasma protein, serum protein, or with fibrin.

- (1) Note. Patents with disclosures to monoclonal antibodies or fragments thereof that bind proteins, including enzymes, that are members of plasma “activation systems”—including the clotting system, the fibrinolytic system, the bradykinin system, and the complement system—are proper for this subclass.
- (2) Note. Patents with disclosures to non-anti-idiotypic monoclonal antibodies or fragments thereof that bind immunoglobulins are proper for this subclass, unless



the monoclonal antibodies specifically bind lymphocyte-bound immunoglobulins, in which case, they are proper for subclass 388.73.

- (3) Note. See Patent Classification Definitions for Class 530, subclasses 380+, for examples of plasma and serum proteins.

**388.26 Binds enzyme:**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an enzyme.

**388.3 Binds virus or component or product thereof (e.g., virus-associated antigen, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a virus, or with a substance shed by a virus, such as a viral antigen.

**388.35 Binds retrovirus or component or product thereof (e.g., HIV, LAV, HTLV, etc.):**

This subclass is indented under subclass 388.3. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a retrovirus, or with a substance shed by a retrovirus, such as a viral antigen.

- (1) Note. Retroviruses are RNA viruses that encode the enzyme reverse transcriptase and that are associated with acquired immune deficiency syndrome (AIDS) and related disorders, as well as with some forms of cancer, such as those caused by HTLV (human T-lymphotropic virus) I and II, Rous sarcoma virus, MMTV (murine mammary tumor virus), feline leukemia virus, etc.

**388.4 Binds bacterium or similar microorganism or component or product thereof (e.g., Streptococcus, Legionella, Myco-**

**plasma, bacterium-associated antigen, exotoxin, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a bacterium or similar micro-organism, or with a substance shed or secreted by a bacterium or similar micro-organism.

- (1) Note. For the purpose of this subclass, micro-organisms “similar” to bacteria are those that have properties in common with typical bacteria, but which differ from them in characteristic ways. Examples of such micro-organisms are rickettsiae, chlamydiae, and mycoplasmas.

**388.5 Binds fungus or plant cell or component or product thereof (e.g., fungus-associated antigen, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a fungus or plant cell, or with a substance shed or secreted by a fungus or plant cell.

- (1) Note. Fungi include yeast and mold.

**388.6 Binds parasitic protozoan or metazoan cell or component or product thereof (e.g., Dirofilaria, Eimeria, Coccidia, Trichinella, parasite cell-surface antigen, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a parasitic protozoan or metazoan cell, or with a substance shed or secreted by a parasitic protozoan or metazoan cell.

- (1) Note. Metazoan parasites include such multicellular organisms as the parasitic flatworms and roundworms.

**388.7 Binds hematopoietic cell or component or product thereof (e.g., erythrocyte, granulocyte, macrophage, monocyte, platelet, myelogenous leukemia cell, bone marrow stem**

**cell, granulocytic cell-surface antigen, hemoglobin, thrombospondin, glycophorin, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a hematopoietic cell, or with a substance shed or secreted by a hematopoietic cell.

- (1) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells, including cells at any stage of differentiation from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

**388.73 Binds lymphocytic or lymphocytic-like cell or component or product thereof (e.g., B cell, B-lineage bone marrow cell, null cell, natural killer cell, B-lymphoblastoid cell, B-lineage acute lymphoblastic leukemia cell, B-lymphocytic cell-surface antigen, etc.):**

This subclass is indented under subclass 388.7. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a lymphocytic or lymphocytic-like cell, or with a substance shed or secreted by a lymphocytic cell or lymphocytic-like cell.

- (1) Note. Lymphocytes are considered to be either B- or T-lineage cells. Null cells, K cells, and natural killer cells are considered "lymphocytic-like" cells, since they have the morphology of lymphocytes but not the antigenic markers of either B- or T-lineage cells.

**388.75 Binds T-lymphocytic cell or component or product thereof (e.g., T cell, thymocyte, T-lineage bone marrow cell, T-lymphoblastoid cell, T-lineage acute lymphoblastic leukemia cell, T-lymphocytic cell-surface antigen, etc.):**

This subclass is indented under subclass 388.73. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a T-

lymphocytic cell, or with a substance shed or secreted by a T-lymphocytic cell.

**388.8 Binds cancer cell or component or product thereof (e.g., cell-surface antigen, etc.):**

This subclass is indented under subclass 388.2. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a cancer cell, or with a substance shed or secreted by a cancer cell.

**388.85 Binds antigen characterized by name or molecular weight (e.g., CEA, NCA, CC glycoprotein, melanoma gp 150 antigen, etc.):**

This subclass is indented under subclass 388.8. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an antigen that is an integral or isolated part of a cancer cell, or that is shed or secreted by a cancer cell, and that is disclosed by name or molecular weight.

**388.9 Binds drug, hapten, hapten-carrier complex, or specifically-identified chemical structure (e.g., theophylline, digoxin, etc.):**

This subclass is indented under subclass 388.1. Subject matter involving a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a drug, hapten, hapten-carrier complex, or with a specifically-identified chemical structure that is disclosed.

- (1) Note. A hapten is a molecule or portion thereof that has little or no antigenicity unless coupled to a carrier molecule that is antigenic. Haptens are usually, but not always, of low molecular weight. Common carriers are proteins such as bovine serum albumin (BSA) and keyhole limpet hemocyanin (KLH).

**389.1 Polyclonal antibody or immunoglobulin of identified binding specificity:**

This subclass is indented under subclass 387.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose binding specificity is disclosed.

- (1) Note. “Binding specificity” refers to the antigen or antigenic determinant that will combine with the antigen-binding site(s) of a polyclonal antibody or antigen-binding fragment(s) thereof; i.e., a polyclonal antibody or antigen-binding fragment thereof may have binding specificity for an animal cell, etc.

**389.2 Binds hormone, lymphokine, cytokine, or other secreted growth regulatory factor, differentiation factor, intercellular mediator, or neurotransmitter (e.g., insulin, human chorionic gonadotropin, glucagon, cardiodilatin, interleukin, interferon, norepinephrine, epinephrine, acetylcholine, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a hormone, lymphokine, cytokine, or other secreted growth regulatory factor, differentiation factor, intercellular mediator, or neurotransmitter.

- (1) Note. The term “growth regulatory factor” is meant to encompass any secretory factor that is growth-stimulatory or growth-inhibitory; i.e., that will stimulate or inhibit clonal expansion of cells.
- (2) Note. The term “differentiation factor” is meant to encompass any secretory factor that causes cells to progress from a relatively undifferentiated state to a more differentiated state, wherein said progression may include clonal expansion.
- (3) Note. The term “intercellular mediator” is meant to encompass any secretory factor that affects cellular functions such as chemotaxis, etc.
- (4) Note. See Patent Classification Definitions for Class 424, subclass 85.1 for examples of lymphokines and cytokines.
- (5) Note. This subclass includes polyclonal antibodies, immunoglobulins, or fragments thereof that bind any growth regulatory factor, differentiation factor, or intercellular mediator that targets any

type(s) of cells, including hematopoietic cells.

- (6) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells, including cells at any stage of differentiation from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

**389.3 Binds plasma protein, serum protein, or fibrin (e.g., clotting factor, fibrinolytic factor, complement factor, immunoglobulin, apolipoprotein, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a plasma protein, serum protein, or with fibrin.

- (1) Note. Patents with disclosures to polyclonal antibodies or immunoglobulins or fragments thereof that bind proteins, including enzymes, that are members of plasma “activation systems”—including the clotting system, the fibrinolytic system, the bradykinin system, and the complement system—are proper for this subclass.
- (2) Note. Patents with disclosures to nonanti-idiotypic polyclonal antibodies or fragments thereof that bind immunoglobulins are proper for this subclass, unless the antibodies specifically bind lymphocyte-bound immunoglobulins, in which case the patents are proper for subclass 389.6.
- (3) Note. See Patent Classification Definitions for Class 530, subclasses 380+ for examples of plasma and serum proteins.

**389.4 Binds virus or component or product thereof (e.g., virus-associated antigen, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a

virus, or with a substance shed by a virus, such as a viral antigen.

**389.5 Binds bacterium or similar microorganism or component or product thereof (e.g., pseudomonas, chlamydia, clostridium, bacterium-associated antigen, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a bacterium or similar micro-organism, or with a substance shed or secreted by a bacterium or similar micro-organism.

- (1) Note. Micro-organisms "similar" to bacteria are those that have properties in common with bacteria, but which differ from typical bacteria in characteristic ways. Examples of such microorganisms are rickettsiae, chlamydiae, and mycoplasmas.

**389.6 Binds hematopoietic cell or component or product thereof (e.g., erythrocyte, granulocyte, bone marrow cell, lymphocyte, leukemic cell, hematopoietic cell-surface antigen, hemoglobin, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a hematopoietic cell, or with a substance shed or secreted by a hematopoietic cell.

- (1) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells, including cells at any stage of differentiation, from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

**389.7 Binds cancer cell or component or product thereof (e.g., cell-surface antigen, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a

cancer cell, or with a substance shed or secreted by a cancer cell.

**389.8 Binds drug, hapten, hapten-carrier complex, or specifically-identified chemical structure (e.g., theophylline, digoxin, etc.):**

This subclass is indented under subclass 389.1. Subject matter involving a polyclonal antibody or immunoglobulin or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a drug, hapten, hapten-carrier complex, or with a specifically-identified chemical structure that is disclosed.

- (1) Note. A hapten is a molecule or portion thereof that has little or no antigenicity unless coupled to a carrier molecule that is antigenic. Haptens are usually, but not always, of low molecular weight. Common carriers are proteins such as bovine serum albumin (BSA) and keyhole limpet hemocyanin (KLH).

**390.1 Removing or inactivating virus or bacterium or component or product thereof (e.g., endotoxin, etc.):**

This subclass is indented under subclass 387.1. Subject matter involving a process of removing or inactivating a virus, a bacterium, or a component or product thereof that contaminates an immunoglobulin preparation; or an immunoglobulin preparation prepared thereby.

SEE OR SEARCH THIS CLASS, SUBCLASS:

831, for immunoglobulins isolated via the Cohn fractionation method.

**390.5 Removing, dissociating or preventing the formation of aggregated, denatured, fragmented, or polymerized immunoglobulin or antibody; or preventing or reducing complement fixation or binding; or reducing antigenicity; or removing, inactivating, or inhibiting contaminating plasma proteins (e.g., proteolytic enzymes, etc.):**

This subclass is indented under subclass 387.1. Subject matter involving a process of removing, dissociating, or preventing the formation of aggregated, denatured, fragmented, polymerized immunoglobulins or antibodies; or a process of preventing or reducing complement fixation or complement binding by an immunoglobulin preparation; or a process of reducing

the antigenicity of an immunoglobulin preparation; or a process of removing, inactivating, or inhibiting plasma proteins, such as proteolytic enzymes, that contaminate an immunoglobulin preparation; or involving an immunoglobulin preparation prepared thereby.

- (1) Note. This subclass provides for methods of removing plasma proteins that copurify with immunoglobulins and for methods of removing immunoglobulin fragments or aggregates that create adverse effects, such as complement activation--i.e., "anticomplementary activity"--when an immunoglobulin preparation is administered intravenously.

SEE OR SEARCH THIS CLASS, SUBCLASS:

831, for immunoglobulins isolated via the Cohn fractionation method.

**391.1 Monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is conjugated or adsorbed (e.g., adsorbed to a solid support, etc.):**

This subclass is indented under subclass 386. Subject matter involving a monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is bound to another molecule via a covalent bond or chemical group, or that is adsorbed to another substance.

- (1) Note. An immunoglobulin chemically bound to a synthetic resin is proper for Class 525, subclass 54.1.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 178.1+, for bio-affecting and body-treating compositions of conjugates or complexes of monoclonal or polyclonal antibodies, immunoglobulins, or fragments thereof with nonimmunoglobulin materials, and for bioaffecting and body-treating methods of using conjugates or complexes of monoclonal or polyclonal antibodies, immunoglobulins, or fragments thereof with nonimmunoglobulin materials or compositions thereof.

**391.3 Conjugated to a detectable label or radioisotope or radionuclide or heavy metal-containing compound:**

This subclass is indented under subclass 391.1. Subject matter involving a monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is conjugated to a detectable label, radioisotope or radionuclide, or heavy metal-containing compound.

SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology and Microbiology, subclass 188 for antibodies conjugated to enzymatic labels.

**391.5 Conjugated via a specifically-identified linking group, chelating group, coordination complex, coupling agent, or conjugation agent:**

This subclass is indented under subclass 391.3. Subject matter involving a monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is conjugated via a linking group, chelating group, coordination complex, coupling agent, or conjugation agent that is specifically identified in the claims by name or chemical structure.

- (1) Note. Claim language such as "an antibody covalently bonded to a detectable label" or "an antibody bound covalently to a detectable label" is not intended for this subclass, but is proper for subclass 391.3. Claim language such as "an antibody bound by a disulphide bond to a detectable label" or "an antibody bound by an amide bond to a detectable label" is proper for this subclass because it describes the type of linkage between the antibody and the substance to which it is linked.

**391.7 Conjugated to a cytotoxic agent or drug or other biologically-active substance:**

This subclass is indented under subclass 391.1. Subject matter involving a monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is conjugated to a cytotoxic agent, drug, or other biologically-active substance.

## SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology and Microbiology, subclass 188 for antibodies conjugated to enzymes.

**391.9 Conjugated via a specifically-identified linking group, coupling agent, or conjugation agent:**

This subclass is indented under subclass 391.7. Subject matter involving a monoclonal or polyclonal antibody or immunoglobulin or fragment thereof that is conjugated via a linking group, coupling agent, or conjugation agent that is specifically identified in the claims by name or chemical structure.

- (1) Note. Claim language such as “an antibody covalently bonded to a toxin” or “an antibody bound covalently to a toxin” is not intended for this subclass, but is proper for subclass 391.7. Claim language such as “an antibody bound by a disulphide bond to a toxin” or “an antibody bound by an amide bond to a toxin” is proper for this subclass because it describes the type of linkage between the antibody and the substance to which it is linked.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

861, through 868, for cross-reference art collections related to subclasses 387.1-391.9.

**392 Alpha globlins, e.g., ceruloplastin, haptoglobins, etc.:**

This subclass is indented under subclass 380. Proteins identified as alpha globulins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties.

alpha 1 globulins alpha 2 globulins

## Molecular Weight

40,000–55,000 63,000–800,000

## OTHER COMPONENT

saccharide

saccharide

- (2) Note. The alpha 2 globulin includes alpha 2 glycoproteins, ceruloplasmin and prothrombin.
- (3) Note. Examples: Alpha-2-macroglobulin, Alpha 1 microglobulin Alpha-2u-globulin precursor, Progesterone binding globulin.
- (4) Note.

also.

## Mesh tree

number: D12.776.124.790.106  
D12.776.377.715.85

## SEE OR SEARCH THIS CLASS, SUBCLASS:

359, for alpha 1 lipoproteins.  
384, for the alpha globulin prothrombin.

**393 Antithrombin III:**

This subclass is indented under subclass 392. Proteins having the structure of antithrombin III and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physiological properties. A plasma glycoprotein having antithrombin activity and serving to inhibit other enzymes.
- (2) Note. Synonyms. Heparin cofactor, Antithrombin II.
- (3) Note.

Mesh tree D8.373.745.109.100

Number: D12.776.124.790.106.125

D12.776.377.715.85.125

**394 Beta globulins, e.g., transferrin, etc.:**

This subclass is indented under subclass 386. Proteins having the structure of a beta globulin and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. Physical Properties. Beta 1 Lipoproteins Transferrin Plasminogen; Molecular Weight: 3-20 million - 85,00090,000. Other Components: lipid; saccharide

(2) Note. Examples. Beta-2-microglobulin, Beta-Thromboglobulin, Beta trace protein.

(3) Note. CA Registry Number:

Mesh tree number: D12.776.124.790.223

D12.776.377.715.182

SEE OR SEARCH THIS CLASS, SUBCLASS:

359, for beta 1 lipoproteins.

**395 Glycoproteins, e.g., mucins, proteoglycans, etc.:**

This subclass is indented under subclass 350. Proteins comprising a protein bonded to saccharide and compounds derived from these by addition to or deletion of parts of the structure.

(1) Note. Included in this subclass are:

amyloid proteins; colony-stimulating factor; fibronectins; hemopexin; lactoferrin; mucoproteins, mucopolysaccharides; intrinsic factor; mucins; orosomucoid; proteoglycans; sialoglycoproteins; thromboprotein; thyroglobulin; thyroxine binding protein; transcortin; tubulin

(2) Note.

**GLYCOPROTEINS PROTEOGLYCANS**

Mesh tree number:

D12.776.395

D9.203.698.735

D12.776.395.650

**396 LECTINS, E.G., CONCAVALIN, HEMAGGLUTININ, ETC.:**

This subclass is indented under subclass 395. Proteins having the structure of lectins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

(1) Note. Physical Properties:

**Physical Properties:**

Lentil  
Alpha chain Beta  
chain

**Number of Residues:**

207 52 159

**Molecular Weight:**

24,216 5,709 17,585

(2) Note. Physiological properties. Binder sugar moieties in cell walls or membranes to cause agglutination, mitosis, or other changes in the cell.

(3) Note. Synonyms. Phytohemagglutinins, Agglutinins, Phytagglutinins, Hemagglutinins, Plant agglutinins.

(4) Note. CA Registry Number: 9008-97-3\*

Mesh tree number: D24.185.526.545

D24.310.545

D24.611.125.44.545

Merck Index Monograph: 10: 5272

**397 Glycoprotein hormones:**

This subclass is indented under subclass 395. Proteins having the structure of or functioning as hormones and derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note.

Mesh tree number: D12.776.395

D6.472

**398 Gonadatropins:**

This subclass is indented under subclass 397. Proteins having the structure of gonadatropins and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physiological properties. Stimulate the gonads to growth and production of sex-specific hormones, i.e., estrogens and gestagens in the female and androgens in the male.
- (2) Note. Examples: Choriogonin, Bigonadil, Choriogonadotropin, Chorulon, HGC, Follitropin, or Follicle-stimulating hormone (FSH), Lutropin, or Luteinizing hormone (LH), Human menopausal gonadotropin (Urogonadotropin, hMG, Chorionic gonadotropin (Choriogonadotropin, (hCG).
- (3) Note.

Mesh tree number: D6.472.351.326

D6.472.759.367

D6.472.785.400

D12.776.780.400

Merck Index Monograph: 9: 4376

10: 4506

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 110 for gonadotropin peptide or protein sequences.

**399 Hormones, e.g., prolactin, thymosin, growth factors, etc.:**

This subclass is indented under subclass 350. Proteins functioning as hormones and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Mesh tree number: D6.472

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 120 for growth factor peptide or protein sequences.

**400 Metal containing, e.g., chromoproteins, ferritin, ferredoxins, etc.:**

This subclass is indented under subclass 350. Proteins containing a metal and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Examples, Myoglobin, Metallothronenin, Hemerythrin, Iron sulfur proteins.
- (2) Note. CA Registry Number of Ferritin form: 9007-73-2\*. Mesh tree number: D12.776.556.

SEE OR SEARCH CLASS:

930, Peptide or Protein Sequence, subclass 25 for peptide or protein sequences containing an amino acid modified with a heavy metal.

**401 Cytochromes, e.g., orgotein, etc.:**

This subclass is indented under subclass 400. Proteins having the structure of cytochrome and compounds derived from these by addition to or deletion of parts of the polypeptide structure.

- (1) Note. Physical Properties.



## Cytochrome C2      Cytochrome C1

## Number of Residues:

85                                      129

## Molecular Weight:

8,899                                      13,283

## Source:

Rhodopseudomonas gelatinosa

- (2) Note. Synonyms. of orgotein: heapatocuprein, cerebrocuprein, erythrocuprein, cytocuprein. Of Cytochrome c: Myohematin, Hematin-Protein, Cromoci, Cytores, Landrax

- (3) Note. CA Registry Number of underivatized form:

**Cytochrome C: 9007-43-6****Mesh tree number: D8.262**

D12.776.422.220

**Merck Index Monograph: 9:2788**

10:2784

**402      Chemical modification or the reaction product thereof, e.g., covalent attachment or coupling, etc.:**

Subject matter under 350 including a step of chemically modifying a protein or the product of such modification.

- (1) Note. Chemical modification includes conjugation of a protein with a nonpeptide compound or addition of simple chemical elements or compounds to the protein as well as sundering parts of a large protein molecule.
- (2) Note. Treatment to deliberately change the secondary, tertiary or quaternary structure of a polypeptide is considered chemical modification.

- (3) Note. Other subclasses provide for protein conjugates that occur in nature. Nucleoproteins are in subclass 358. Lipoproteins are in subclass 359. Metalloproteins in subclasses 400 and 401.

- (4) Note. Immobilized Proteins. Cross-reference art collections 810+ provide for carrier bound or immobilized proteins where the protein is combined chemically or physically with a carrier that insolubilized it or otherwise aids in the recovery of the protein from solution.

- (5) Note. This subclass provides for melanoidin resulting from Mallard type reactions between amino acids and sugars.

**SEE OR SEARCH CLASS:**

- 524, Synthetic Resins or Natural Rubbers, subclasses 9+ for plant or derived cellular material, subclasses 17+ for proteins or biologically active polypeptides for a process in which the protein or polypeptide is physically mixed with a preformed resin and subclasses 70+ for a process of adding a protein or biologically active polypeptide to resin forming ingredients during reaction of the resin formers and the protein of polypeptide is nonreactive.
- 525, Synthetic Resins or Natural Rubbers, subclass 54.1 for the chemical reaction of a peptide or protein with a preformed resin and subclass 54.11 for processes of stepwise assembly of a polypeptide on a preformed polymer i.e., solid phase synthesis when there is no claimed cleavage of synthesized polypeptide.

**403      Protein is identified as an antigen, e.g., immunogenic carriers, etc.:**

This subclass is indented under subclass 402. Subject matter in which the protein is reacted with another material and the protein is claimed or disclosed as an antigen.

- (1) Note. The compound reacting with the antigenic protein may itself be a protein or polypeptide. All such compounds are

conclusively presumed to belong in subclass 405, even though they may contain sulfur.

- (2) Note. The typical patent in this and the indented subclasses is directed to the use of an antigenic protein as an immunogenic carrier for a hapten.

**SEE OR SEARCH CLASS:**

514, Drug, Bio-Affecting and Body Treating Composition, subclasses 1 through 21 and Cross-Reference Art Collections 800-809 which provide for compositions having a 424 utility containing a peptide or protein as an organic active ingredient.

**404 Sulfur containing reactant:**

This subclass is indented under subclass 403. Subject matter in which the material reacting with the protein contains sulfur.

**405 Nitrogen containing reactant:**

This subclass is indented under subclass 403. Subject matter in which the material reacting with the protein contains nitrogen.

**406 Oxygen containing reactant:**

This subclass is indented under subclass 403. Subject matter in which the material reacting with the protein contains oxygen.

**407 Hydrolysis of protein:**

This subclass is indented under subclass 402. Subject matter in which the protein is subject to autolysis or chemical hydrolysis.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclasses 68.1+ for a process of hydrolysis by micro-organism or enzyme wherein a protein is produced and subclass 272 for recovering a preexisting protein by means of a micro-organism or enzyme.

**408 Sulfur containing reactant:**

This subclass is indented under subclass 402. Subject matter in which the material reacting with the protein contains sulfur.

**409 Nitrogen containing reactant:**

This subclass is indented under subclass 402. Subject matter in which the material reacting with the protein contains nitrogen.

**410 Oxygen containing reactant:**

This subclass is indented under subclass 402. Subject matter in which the material reacting with the protein contains oxygen.

**411 Oxygen containing is a saccharide:**

This subclass is indented under subclass 410. Subject matter in which the material reacting with the protein is or contains saccharide.

**412 Separation or purification:**

This subclass is indented under subclass 350. Processes in which a protein is separated from another material.

- (1) Note. This and the indented subclasses provide for original patents directed to the production of proteins claimed generically and for cross-references of named proteins provided for above.

- (2) Note. This and the indented subclasses provide for a process which includes a chemical reaction so long as the chemical reaction is part of a separation or purification procedure and provided that the reactants do not include the protein to be recovered.

- (3) Note. See subclass 344 for a comprehensive listing of classes which provide for separation process where the material purified is not specifically claimed as being a protein.

**413 Immunological separation or affinity chromatography:**

This subclass is indented under subclass 412. Processes in which an antigen antibody or binding protein reaction is used to effect separation of a component of a mixture.

- (1) Note. Mesh tree member: H1.181.278.186.400.170 and E5.196.181.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

387.1+, for immunoglobulins, per se.

417, for separation by chromatography.

SEE OR SEARCH CLASS:

436, Chemistry: Analytical and Immunological Testing, subclass 824 for a digest collection of immunological separation techniques.

#### 414 Ultra filtration or osmosis:

This subclass is indented under subclass 412. Processes in which separation is effected (a) by means of a permeable membrane through which a solvent is forced under pressure carrying low molecular weight compounds through the membrane or (b) by means of a permeable membrane through which compounds are forced by osmotic pressure.

- (1) Note. Ultra filtration membranes typically separate compounds with molecular weight from 1,000 to 1,000,000 dalton (1 to 100 nm) in size.
- (2) Note. Particle dimensions of compounds commonly separated by ultra filtration.

#### Species                      Dimensions(nm)

Proteins/Polysaccharides

( $10^4$ – $10^5$  dalton) 2–10

Enzymes ( $10^4$ – $10^5$  dalton) 2–5

Mono- and Di-Saccharides  
(200–400 dalton) 0.8–1.0

Water (18 dalton) 0.2

- (3) Note. Mesh tree number ultrafiltration.

E5.196.454.807

H1.181.278.469.849

H1.181.529.365.807

H1.671.100.534.807

SEE OR SEARCH CLASS:

210, Liquid Purification, subclass 650 for processes of separation by filtration and subclass 652 for processes of separation by osmosis.

#### 415 Selective absorption, e.g., the use of phosphate sorbents, etc.:

This subclass is indented under subclass 412. Processes in which separation of a protein from a liquid mixture is effected by contact with a solid material which preferentially attracts and holds one of the components of the liquid mixture.

- (1) Note. See the extensive search class notes in Class 210, subclass 660 for related and allied arts and particularly note (4) for the disposition of ion exchange resins.

#### 416 Ion exchange:

This subclass is indented under subclass 415. Process in which separation of a protein from a liquid is effected by a solid insoluble material which captures from the liquid a dissociated charged chemical moiety and releases to the liquid a different charged moiety of the same polarity.

- (1) Note. See Class 210, subclass 660 for comprehensive treatment of the disposition of ion exchange processes in that and other related classes.

- (2) Note.

Mesh tree                      E5.196.181.400.383  
number:                      H1.181.278.186.400.38

3

**417 Chromatography or by septum selective as to material, e.g., gel filtration, molecular sieve dialysis, etc.:**

This subclass is indented under subclass 415. Processes in which a protein is separated from a liquid mixture by a solid sorbent which competes in affinity with a moving carrier liquid or solvent such that a separation is effected by differing speeds of travel through the solid sorbent.

- (1) Note. See Class 210, subclass 658 and the notes thereunder for disposition of chromatography in that and related classes, and Class 210, subclass 635 which provides for gel chromatography.
- (2) Note. This subclass provides for high performance liquid chromatography.
- (3) Note. Mesh tree number:

**Chromatography High Pressure Liquid**

E5.196.181	E5.196.181.400.300
H1.181.278.186	H1.181.278.186.400.300

**418 Precipitation:**

This subclass is indented under subclass 412. Processes in which a protein is separated from a liquid by physical or chemical means to cause the protein or undesired material to agglomerate, coagulate, coalesce or flocculate.

- (1) Note. Precipitation may be either by chemical reaction, including salting out, or by physical means such as agitation or heat.
- (2) Note. See Class 210, subclass 702 for the disposition of precipitation processes Class 210 and other related classes.

**419 With added material:**

This subclass is indented under subclass 418. Processes in which precipitation is brought about by adding a material thereto.

**420 Inorganic:**

This subclass is indented under subclass 419. Processes in which the added material is inorganic.

**421 Polymeric, e.g., polyethylene glycol, etc.:**

This subclass is indented under subclass 419. Process in which the added material is a natural or synthetic polymer.

**422 Solvent extraction:**

This subclass is indented under subclass 412. Process in which a protein is separated from a solid or liquid mixture by preferential dissolution in an added solvent.

- (1) Note. See Class 210, subclass 634 and the extensive notes therein for the disposition of solvent extraction in that class.

**423 Oxygenated material:**

This subclass is indented under subclass 422. Processes in which the solvent contains oxygen.

**424 Alcohol:**

This subclass is indented under subclass 423. Processes in which the oxygenated solvent is an alcohol.

**425 Carboxyl containing:**

This subclass is indented under subclass 423. Processes in which the oxygenated material contains a carboxyl group.

**426 Hydrocarbon or halogenated hydrocarbon:**

This subclass is indented under subclass 422. Processes in which the solvent is a hydrocarbon or a halogenated hydrocarbon.

**427 Physical treatment:**

This subclass is indented under subclass 412. Processes in which a protein is separated or purified by a physical treatment.

- (1) Note. This subclass would provide for separation by ultrasonic treatment of flotation techniques.

**500** Lignins, i.e., the Major Noncarbohydrate Constituents of Wood and Woody Plants, or Reaction Products Thereof.

- (1) Note. The chemical treatment of source materials such as, for example, waste sulfite liquor or black liquor, to derive therefrom a lignin-containing substance is included herein, unless said treatment produces a definite carbon compound which is specifically provided for elsewhere.
- (2) Note. The rules for determining Class placement of the Original Reference (OR) for claimed chemical compositions are set forth in the Class Definition of Class 252 in the SECTION LINES WITH OTHER CLASSES AND WITHIN THIS CLASS, subsection COMPOSITION CLASS SUPERIORITY, which includes a hierarchical ORDER OF SUPERIORITY FOR COMPOSITION CLASSES.

## SEE OR SEARCH CLASS:

- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for tanning agents derived from waste cellulose liberation liquors.
- 117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials, including inorganic or organic.
- 162, Paper Making and Fiber Liberation, for processes of liberating cellulosic fibers which include the recovery of an organic by-product.
- 562, Organic Compounds, subclass 513 for the production of oxalic acid from waste sulfite liquor.
- 501** This subclass is indented under subclass 500. Processes wherein a lignin or a lignin-containing substance is reacted with an aldehyde, with a ketone, or with ozone, or the reaction products thereof.
- (1) Note. See this Class, subclass 507 for processes wherein acetone, for example, is used as a solvent rather than as a reactant.

**502** This subclass is indented under subclass 500. Processes wherein a lignin or a lignin-containing substance is reacted with a compound having hydroxy bonded directly to a benzene ring or with a compound having an oxygen-containing hereto ring, or the reaction products thereof.

**503** This subclass is indented under subclass 500. Processes wherein a lignin or a lignin-containing substance is reacted with hydrogen, or the reaction products thereof.

**504** This subclass is indented under subclass 500. Processes wherein a lignin or a lignin-containing substance is reacted with a carboxylic acid anhydride or with a compound having halogen (i.e., fluorine, chlorine, bromine, or iodine) bonded directly or indirectly to an acyclic carbon by nonionic bonding, or the reaction products thereof.

**505** This subclass is indented under subclass 500. Processes wherein a lignin or a lignin-containing substance is reacted with a compound having nitrogen attached directly or indirectly to carbon by nonionic bonding, or the reaction products thereof.

**506** This subclass is indented under subclass 500. Compounds which contain heavy metal (i.e., metals with a density greater than 4.0), aluminum, silicon, or phosphorus.

**507** This subclass is indented under subclass 500. Processes wherein there is utilized a compound having alcoholic hydroxy bonded directly to an acyclic carbon or an organic solvent, or the reaction products thereof.

(1) Note. The compound having alcoholic hydroxy bonded directly to an acyclic carbon may be used as a solvent or as a reactant.

(2) Note. An alcoholic hydroxy group is one that is bonded to a carbon that is not doubly bonded to chalcogen or to nitrogen, i.e., compounds such as acetic acid, etc., are not considered to have an alcoholic hydroxy group.

## CROSS-REFERENCE ART COLLECTIONS

Cross-reference art collections 860-868 are related to subclasses 387.1 through 391.9

**800 ANTIHYPERTENSIVE PEPTIDES:**

Cross-reference art collection containing patents in which the peptide is claimed or disclosed as lowering blood pressure.

**801 PEPTIDE SWEETNERS:**

Cross-reference art collection containing patents in which the peptide is claimed or disclosed as possessing a sweet taste.

**802 CHROMOGENIC OR LUMINESCENT PEPTIDES:**

Cross-reference art collection containing patents in which the peptide is claimed or disclosed as luminescent or chromogenic.

**806 ANTIGENIC PEPTIDES OR PROTEINS:**

Cross-reference art collection containing patents in which the peptides or proteins are claimed or disclosed as antigens.

- (1) Note. This collection does not include immunogenic carriers conjugated to haptens. Such patents are in subclasses 403+.

**807 HAPTEN CONJUGATED WITH A PEPTIDE OR PROTEIN:**

Cross-reference art collection for peptides or proteins bonded to a compound that is identified as or functions as a hapten.

**808 MATERIALS OR PRODUCTS RELATED TO GENETIC ENGINEERING OR HYBRID OR FUSED CELL TECHNOLOGY, E.G., HYBRIDOMA, MONOCLONAL PRODUCTS, ETC.:**

Cross-reference art collection containing patents in which the peptide or protein is the product of a process involving recombinant DNA technology or hybrid or fused cell technology.

**809 Fused cell products, e.g., hybridoma products, etc.:**

This subclass is indented under subclass 808. Cross-reference art collection for peptide or protein products produced by a fused cell.

**810 CARRIER BOUND OR IMMOBILIZED PEPTIDE OR PROTEIN, PREPARATION**

**THEREOF, E.G., USE OF BIOLOGICAL CELL FRAGMENTS AS CARRIER, ETC.:**

This subclass is indented under the class definition. Cross-reference art collection which is an artificially produced composition or complex or compound containing the property of physical confinement or localization during a continuous chemical process or the property of enhanced recoverability in a batch process for repeated future use and processes for preparing the same.

- (1) Note. Immobilization results from covalent bonding between the peptide or protein and the carrier or an ionic bonding between the peptide or protein and a carrier or sorption of a peptide or protein with a carrier, or entrapment of a peptide or protein within a carrier.
- (2) Note. A carrier material may be either water soluble or water insoluble.
- (3) Note. Peptides chemically or physically bonded to a water-insoluble.
- (3) Note. Peptides chemically or physically bonded to a water-soluble matrix, contained within a polymer or gel, absorbed on a resin are examples of immobilized peptides.
- (4) Note. When a carrier is composed of more than one material, the patent is placed in the subclass which corresponds to the material to which the peptide is bound, e.g., a carrier which is a synthetic polymer coated metal is placed in subclass 421.
- (5) Note. The carrier material or the carrier material and a covalent bond forming agent impart to the peptide or protein the property of physical confinement for localization during continuous process or the property of enhanced recoverability in a batch process which it did not possess prior to treatment with the carrier material or carrier material and a covalent bonding agent.
- (6) Note. Synthetic Resins vs. Polypeptides. The conceptual difference between the subject matter of synthetic resins pro-

vided for in the 520 series and polypeptides (including proteins) provided for in Class 530 is that the compounds of the 520 series have statistically distributed amino acids or blocks of amino acids in their molecules in a random sequence whereas 530 provides for molecules composed of a specific sequence of amino acids of defined identity and order (i.e., primary structure) having identity or close relation to a humeral or cellular polypeptide or having some humeral or cellular effect due to its order structure.

**SEE OR SEARCH CLASS:**

- 65, Glass Manufacturing, for processes of making glass articles, particularly subclass 339 for making optical fibers or waveguides by incorporating dopant into porous glass body; subclass 413 for making optical fibers or waveguides by deposition of vapor onto porous glass body; subclass 432 for making glass optical fibers or waveguides by coating porous glass fibers or waveguides with synthetic or natural resin containing material; subclasses 447+ for making glass fibers or filaments by coating porous glass body with synthetic or natural resin or asphalt containing material; subclass 22 for making a porous glass article which may find utility as an immobilization agent.
- 106, Compositions: Coating, or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 24, 124+, and 645+ indented subclasses.
- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 77+ for pore forming in combination with a laminating step.
- 210, Liquid Purification or Separation, subclasses 263+ and 689 for processes and apparatus for ion exchange or sorption of components from a liquid; and subclass 615 for a process of use of an immobilized enzyme or micro-organism to purify sewage.

- 260, Chemistry of Carbon Compounds, various subclasses for coenzymes or immobilized coenzymes; subclasses 998.2+ utilities intended for use as dyestuffs or pharmaceuticals or otherwise excluded from Class 520, subclasses 1+ by Note (1) of subclasses 1+.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for significant molding processes which include the step of pore forming in situ.
- 424, Drug, Bio-Affecting and Body Treating Compositions, especially subclass 417, 457, 459, and 468 for coated products which may contain a protein; subclasses 94.1+ for a composition containing an enzyme or coenzyme including immobilized forms and subclasses 2+ for a composition containing a protein.
- 428, Stock Material or Miscellaneous Articles, subclasses 474.4+ for a non-structural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses, e.g., subclasses 435 and 458; and subclasses 304.4+ for stock material in the form of a composite web or sheet embodying a component which is porous or cellular.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 174+ for carrier bond or immobilized enzymes or microbial cells and the preparation thereof and subclass 188 for enzyme conjugates, ligands and adducts.
- 436, Chemistry: Analytical and Immunological Chemistry, subclasses 501 through 548 particularly subclass 518 of use of immobilized antigens, antibodies, or other immunochemicals in a test or analysis.
- 521, Synthetic Resins or Natural Rubbers, subclasses 25+ for an ion exchange resin and the processes of making or regenerating them; and subclasses 50+ for cellular or porous resinous bodies and the process of preparing them.

- 525, Synthetic Resins or Natural Rubbers, subclasses 54.1+ for a product or process of chemically reacting a protein or polypeptide with a synthetic resin.
- 527, Synthetic Resins or Natural Rubbers, subclasses 200+ for resinous products and the processes of preparing them wherein protein is incorporated into the resinous structure.
- 811 Peptide or proteins immobilized on or in an inorganic carrier:**  
This subclass is indented under subclass 810. Cross-reference art collection wherein the carrier is an inorganic compound or metal or alloy.
- 812 Peptides or proteins are immobilized on or in an organic carrier:**  
This subclass is indented under subclass 810. Cross-reference art collection wherein the support material is an organic compound.
- 813 Carrier is saccharide:**  
This subclass is indented under subclass 812. Cross-reference art collection wherein the support material is a saccharide.
- (1) Note. Derivatized starch, derivatized cellulose, and polysaccharides are carbohydrates within the meaning of this subclass.
- 814 Cellulose or derivative thereof:**  
This subclass is indented under subclass 813. Cross-reference art collection wherein the carrier is cellulose or a substituted cellulose.
- (1) Note. Examples of substituted cellulose are DEAE cellulose, etc.
- 815 Carrier is synthetic polymer:**  
This subclass is indented under subclass 812. Cross-reference art collection wherein the support material is a linear or cross-linked polymer which is not naturally occurring.
- 816 Attached to the carrier via a bridging agent:**  
This subclass is indented under subclass 815. Cross-reference art collection wherein the peptide or protein is bonded to the polymeric carrier through an intermediate compound which attaches to both the peptide or protein and the carrier.
- (1) Note. The formation of the immobilized peptide or protein may be in a stagewise manner with a reaction between the carrier and bridging agent being complete before the peptide or protein is added or in a process in which the carrier, bridging agent, and peptide or protein are present simultaneously in which case some care should be exercised in distinguishing the process of this subclass from mere entrapment. In general, if three separate entities, i.e., enzyme and two different chemical species are present simultaneously, bonding through a bridging agent should be presumed.
- (2) Note. A product or process classifiable in this subclass combines a polymeric carrier with a bridging agent to provide functional groups for attachment. It should be noted that similar functional groups can be provided by formation of a polymeric carrier by copolymerization of monomers one or more of which contain the desired functional group for attachment and that such would be provided for in subclass 421.
- 817 Entrapped within the carrier, e.g., gel, hollow fibre; etc.:**  
This subclass is indented under subclass 815. Cross-reference art collection wherein the peptide or protein is physically trapped in a reticulated polymer structure.
- 820 PROTEINS FROM MICRO-ORGANISMS:**  
Cross-reference art collection for peptides or proteins derived from micro-organisms.
- (1) Note. The indented collections are left without detailed definition in favor of the many standard reference works in microbiology.
- SEE OR SEARCH CLASS:  
435, Chemistry: Molecular Biology and Microbiology, subclasses 68.1+ for the microbial or enzymatic synthesis of proteins and peptides; subclasses 183+ for the production of enzymes; and subclasses 174+ for the formation of immobilized enzymes and sub-



classes 269 and 272+ for the liberation or purification of proteins by means of a micro-organism or enzyme, particularly subclass 273 for the purification of collagen or gelatin.

**821 Separation of nucleic acid:**

Cross-reference art collection for peptides or proteins which are separated from nucleic acids.

**822 Protozoa:**

This subclass is indented under subclass 820. Cross-reference art collection for peptides or proteins which are separated from Protozoa.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclasses 258.1+ for subject matter involving protozoa, including processes and compositions for their propagation, etc.

**823 Lower fungi, e.g., mold etc.:**

This subclass is indented under subclass 820. Cross-reference art collection for peptides or proteins which are separated from fungi.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclasses 254.1+ for subject matter involving fungi including processes and compositions for their propagation, etc.

**824 Yeasts:**

This subclass is indented under subclass 823. Cross-reference art collection for peptides or proteins which are separated from yeast.

**SEE OR SEARCH CLASS:**

435, Chemistry: Molecular Biology and Microbiology, subclasses 254.2+ and 255.1+ for subject matter involving yeast including processes and compositions for their propagation, etc.

**825 Bacteria:**

This subclass is indented under subclass 820. Cross-reference art collection for peptides or proteins which are separated from bacteria.

**826 Viruses:**

This subclass is indented under subclass 820. Cross-reference art collection for peptides or proteins which are separated from virus.

**827 PROTEINS FROM MAMMALS OR BIRDS:**

Cross-reference art collection for peptides or proteins which are separated from mammals or birds.

- (1) Note. For a detailed list of the parts see the National Library of Medicine's Medical Subject Headings Category A listings. This listing is available online.

**SEE OR SEARCH CLASS:**

424, Drug, Bio-Affecting and Body Treating Compositions, subclass 520 for compositions with a Class 424 utility wherein the active ingredient is an animal extract or tissue of undetermined chemical constitution, i.e., the chemical structure is not sufficiently established to classify the extract elsewhere.

**828 Cancer:**

This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from cancer tissue.

**829 Blood:**

This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from blood.

**830 Plasma; serum:**

This subclass is indented under subclass 829. Cross-reference collection for peptides or proteins which are separated from blood plasma or serum.

**831 Cohn fraction:**

This subclass is indented under subclass 830. Cross-reference art collection for peptides or proteins which are separated from Cohn Fractions.

- 832 Milk; colostrum:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from milk or colostrum.
- 833 Whey; cheese:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from whey or cheese.
- 834 Urine; urinary system:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from urine or from tissue of the urinary system.
- 835 Kidney:**  
This subclass is indented under subclass 834. Cross-reference art collection for peptides or proteins which are separated from the kidney.
- 836 Mucus; mucus glands; bursa; arthral fluid; spinal fluid:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from mucus, mucus producing glands, bursa, arthral fluid or spinal fluid.
- 837 Lymph; lymph-glands; thymus:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from lymph, lymph glands or the thymus.
- 838 Marrow; spleen:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from the marrow or spleen.
- 839 Nerves; or brain:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from the nerves or brain.
- 840 Bones; tendons, teeth; cartilage:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from bones, tendons, teeth or cartilage.
- 841 Muscles; heart:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from muscles or the heart.
- 842 Skin; hair; nails; sebaceous glands; cerumen:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from skin, hair, nails, sebaceous glands or cerumen.
- 843 Digestive system:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from the digestive system.
- (1) Note. For a detailed list of the parts of the various anatomical systems see the National Library of Medicine's Medical Subject Headings Category A listings. This listing is available on line.
- 844 Stomach; intestine:**  
This subclass is indented under subclass 843. Cross-reference art collection for peptides or proteins which are separated from the stomach or the intestines.
- 845 Pancreas:**  
This subclass is indented under subclass 843. Cross-reference art collection for peptides or proteins which are separated from the pancreas.
- 846 Liver:**  
This subclass is indented under subclass 843. Cross-reference art collection for peptides or proteins which are separated from the liver.
- 847 Bile:**  
This subclass is indented under subclass 843. Cross-reference art collection for peptides or proteins which are separated from the liver bile.

- 848 **Lungs:**  
Cross-reference art collection under 827 for peptides or proteins which are separated from the lungs.
- 849 **Eyes; vessels; umbilical cord:**  
Cross-reference art collection under 827 for peptides which are separated from the eye, blood vessels or umbilical cord.
- 850 **Reproductive organs or embryos:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from the reproductive organs or from embryos.
- 851 **Placenta; amniotic fluid:**  
This subclass is indented under subclass 850. Cross-reference art collection for peptides or proteins which are separated from the placenta or amniotic fluid.
- 852 **Sperm:**  
This subclass is indented under subclass 850. Cross-reference art collection for peptides or proteins which are separated from sperm.
- 853 **Ovary; eggs; embryos:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from the ovary, eggs or embryo.
- 854 **Glands:**  
This subclass is indented under subclass 827. Cross-reference art collection for peptides or proteins which are separated from glands not otherwise provided for.
- 855 **PROTEINS FROM ANIMALS OTHER THAN MAMMALS OR BIRDS:**  
Cross-reference art collection peptides or proteins from animals other than mammals or birds.
- SEE OR SEARCH CLASS:  
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 520 for compositions with a Class 424 utility wherein the active ingredient is an animal extract or tissue of undetermined chemical constitution, i.e., the chemical structure is not sufficiently established to classify the extract elsewhere.
- 856 **Snakes; venom:**  
This subclass is indented under subclass 855. Cross-reference art collection for peptides or proteins from snakes or snake venom.
- 857 **Fish, fish eggs; shell fish; crustacea:**  
This subclass is indented under subclass 855. Cross-reference art collection for peptides or proteins from fish, fish roe, shell fish or crustacea.
- 858 **Insects; venom:**  
This subclass is indented under subclass 855. Cross-reference art collection for peptides or proteins from insects or insect venom.
- 859 **WASTE, WASTE MATERIAL, REFUSE OR SLUDGE, E.G., EFFLUENTS, FECAL MATTER, ETC.:**  
Cross-reference art collection for peptides or proteins from waste, waste material, refuse or sludge.
- 860 **RENIN INHIBITORS:**  
Subject matter involving substances that inhibit the angiotensinogen-cleaving action of renin.
- (1) Note. This and the following Cross-reference art collections are related to subclasses 387.1 through 391.9.
- 861 **INVOLVING IgG<sub>3</sub>, IgG<sub>4</sub>, IgA, OR IgY:**  
Subject matter involving immunoglobulin IgG<sub>3</sub>, IgG<sub>4</sub>, IgA, or IgY.
- (1) Note. IgY is similar to IgG and is found only in birds.
- 862 **INVOLVING IgE OR IgD:**  
Subject matter involving immunoglobulin IgE or IgD.
- 863 **INVOLVING IgM:**  
Subject matter involving immunoglobulin IgM.
- 864 **Monoclonal:**  
This subclass is indented under subclass 863. Subject matter involving a monoclonal antibody that is IgM.

- 865      Human:**  
This subclass is indented under subclass 864.  
Subject matter involving a human monoclonal antibody that is IgM.
- 866      INVOLVING IMMUNOGLOBULIN OR ANTIBODY FRAGMENT (E.G., F<sub>(ab)</sub>'<sub>2</sub>, F<sub>ab</sub>', F<sub>ab</sub>, F<sub>v</sub>, F<sub>c</sub>, HEAVY CHAIN, LIGHT CHAIN, ETC.):**  
Subject matter involving an immunoglobulin or antibody fragment.
- 867      INVOLVING IMMUNOGLOBULIN OR ANTIBODY PRODUCED VIA RECOMBINANT DNA TECHNOLOGY:**  
Subject matter involving an immunoglobulin or antibody produced via recombinant DNA technology.
- 868      INVOLVING                      AUTOIMMUNITY, ALLERGY, IMMEDIATE HYPERSENSITIVITY, DE-LAYED HYPERSENSITIVITY, IMMUNOSUPPRESSION, OR IMMUNOTOLERANCE:**  
Subject matter involving an immunoglobulin or antibody associated with autoimmunity, allergy, immediate hypersensitivity, delayed hypersensitivity, immunosuppression, or immunotolerance.

END